

MODEL AIRPLANE NEWS

MAY 1944
TWENTY CENTS

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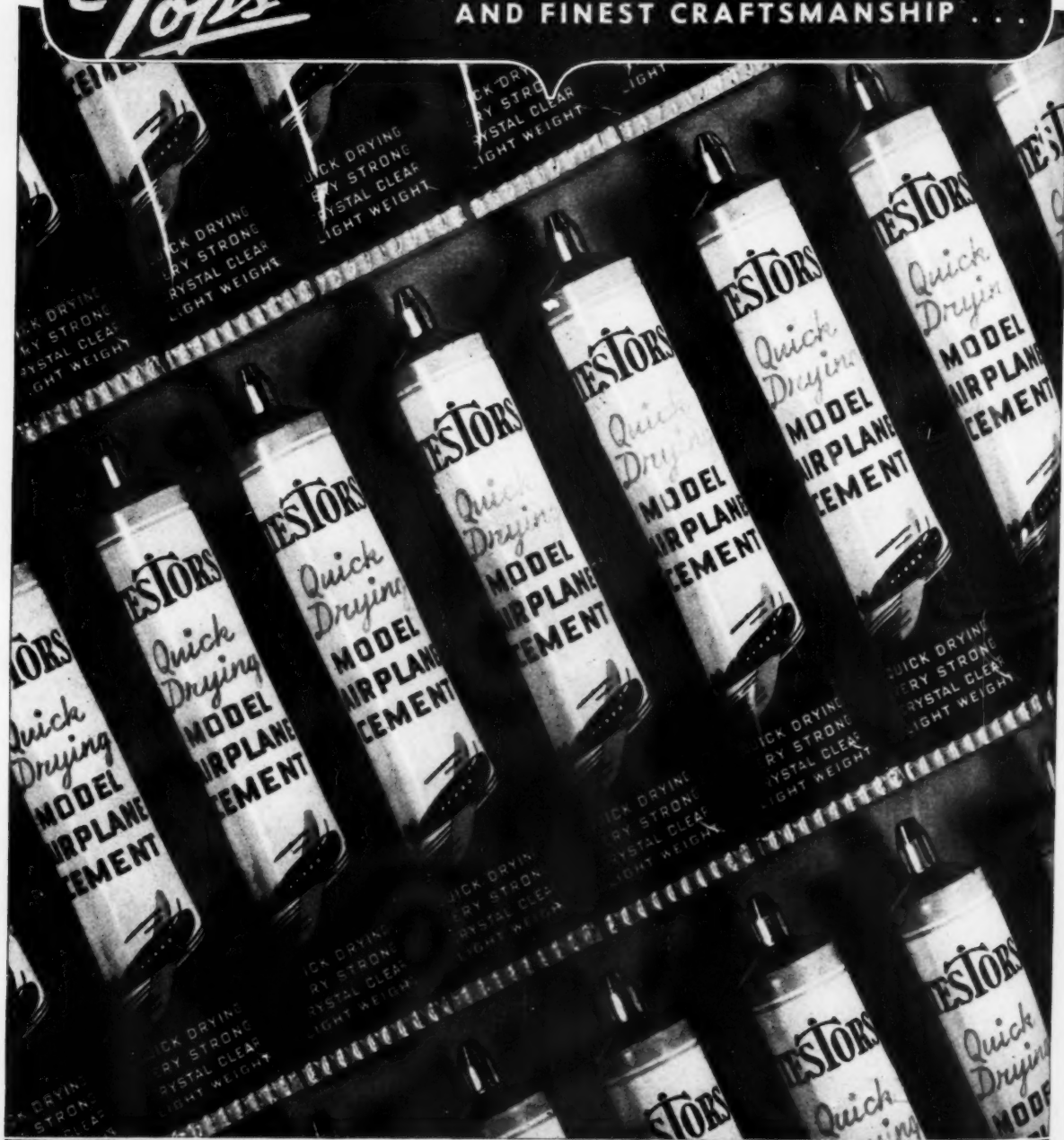
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TESTOR CHEMICAL COMPANY, ROCKFORD, ILLINOIS, U.S.A.



One More on the Nose!

A fighting flier wears his decorations on his chest. But a fighting plane wears hers on her nose.

And one look at the bombs and Swastikas painted on this B-26—"The Exterminator"—will tell you she's a two-fisted fightin' fool!

Like the notches on an old-time Injun-fighter's gun, they keep track of her score. A bomb for every one of her 40 successful missions . . . a Swastika for each of the six Nazi planes she's shot down.

"The Exterminator" fought her way through some of the war's hottest actions. She blasted Bizerte, Tunis,



40 MISSIONS—NOBODY SCRATCHED

Every Bombardier, every Navigator, every Pilot, every Gunner who wears A. A. F. wings, gets training unequalled by that of any air force in the world . . . training that makes him a better flier and a better fighter than the enemy he meets.

Sousse, Pantelleria, Sardinia, Naples and Rome. She "exterminated" the Germans' bridges, shattered their railroad yards, skip-bombed their ships. She pounded Salerno for a week to help pave the way for the 5th Army's landing.

Yet on all these flights, in all these fights, *not a man in her crew was scratched.* That's the kind of fighting record that makes bad reading in Berlin!

And that's the kind of team *you'll* be on when you fly with the A. A. F. . . . the hardest-hitting, best-trained team that ever took to the sky!

Bombardier, Navigator, Pilot, Gunner . . . whatever wings you wear . . . you'll hit the enemy often, and hit him hard. And you'll know how to get back home, so you can hit him again tomorrow.

And the Swastikas, or Rising Suns, painted on the nose of *your* plane, will be plenty of proof that you, too, are part of the "greatest team in the world!"

U. S. ARMY RECRUITING SERVICE



FLY AND FIGHT WITH THE

GREATEST TEAM IN THE WORLD

MEN OF 17...

You can get ready now for your place on the "greatest team in the world"—the A. A. F.—as Bombardier, Navigator, Pilot or Gunner. Go to the nearest Aviation Cadet Examining Board . . . see if you can qualify for the Air Corps Enlisted Reserve. If you qualify, you will receive the Enlisted Reserve insignia shown above . . . but will not be called for training until you are 18 or over.

When called, your special aptitudes will be studied further to determine the type of training you will receive. For the A. A. F. not only builds a combat crew from the pick of the crop, but carefully selects for each position the man with the best capabilities for the job . . . and then adds the thorough training which makes this all-star team the world's finest.

Prepare yourself in advance by taking C. A. P. Cadet Training as given by your local Civil Air Patrol. Also see your High School principal or adviser about recommended courses in the Air Service Division of the High School Victory Corps. Both afford valuable pre-aviation training.

(Essential workers in War Industry or Agriculture—do not apply.)

For information on Naval Aviation Cadet Training, apply at nearest Office of Naval Officer Procurement. This advertisement has the approval of the Joint Army Navy Personnel Board.

KEEP 'EM FLYING!

MODEL AIRPLANE NEWS

MAY, 1944

Vol. XXX, No. 5

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AFTER four and one-half years of war, Allied airpower is now preparing to "move in for the kill." In the middle of March, 1944, airpower was given the "go ahead" signal for only then was it prepared completely for its task. The offensive strength of the *Luftwaffe* reached its pinnacle in the Fall of 1940 when the brilliant courage of the Royal Air Force fighters turned the enemy back during the Battle of Britain. The battering process thus began nearly four years ago and not until now has Allied airpower broken the resistance of the *Luftwaffe* fighters, a task necessary of accomplishment before the bombers, the embodiment of airpower, could begin their destruction of Germany. In mid-March the greatest aerial battles of all history were fought—and won—by Allied aerial might and, for the first time, American bombers struck Berlin. In three tremendous attacks, we lost 113 bombers including over one thou-

British R.A.F. night bombers are now dropping 12,000 lb. bombs, biggest ever used.

R.A.F. photo reconnaissance units learned, some time ago, that bomb destruction on the enemy was not nearly so devastating as had been previously believed. With normal bombs (demolition type powders), damage was confined and thousands of tons was required to completely annihilate a local area. As a result of these studies, incendiary powder is mixed with the charge and the region is blanketed with fiery particles. A small number of small magnesium bombs enlarges the conflagration and recent pictures show localized areas demolished by the bomb charge but wide regions gutted by fire. New bombs contain this incendiary powder and their effectiveness has been greatly increased thereby.

Senator Truman's annual report on the state of the nation's war effort mentioned



First photos of Lockheed Lightning F-5 photo plane. Armed only with cameras (right) it relies on speed for defense

sand crew members. The greatest loss occurred in the first raid; then losses tapered off until the fourth attack when not a single *Luftwaffe* fighter was sighted!

There may be several explanations for this: conservation of strength by the enemy, a heavy cloud bank or a temporary shortage of pilots and planes in the local Berlin area. However, the optimistic firmly believe that there exists but one answer: the *Luftwaffe* fighter strength has been broken—completely and permanently! Should this be so, we can now "move in for the kill!"

On the sidelines, many of us chafe at delay. Why has it taken so long to begin this "all-out" attack on Berlin? A simple answer: a recent raid required 12,000 men to man the bombers and escorting fighters, 3,000 tons of bombs, 19,000,000 rounds of machine-gun ammunition, 120,000 rounds of cannon ammunition, 163,000 gallons of oil and 3,360,000 gallons of gasoline! The following day that exact total was required all over again!



three new planes, each of a different type. News of the Grumman F7F-1 twin-engined single-seat fighter has revealed it is "faster and more heavily armed" than previous Navy fighter planes. The new Douglas XBTD-1 (not to be confused with the obsolete TBD-1) is a single-seat bomber-torpedo plane (the Navy designates primary missions first, secondary missions second) "better than anything of its type now in use." The new Douglas A-26 light bomber and high-speed ground cooperation machine will become the "standard light bomber in production next year."

(Turn to page 38)

Fellows, You're In SOLID With MODELRAFT Kits!

Modelers Are Going For 'Em!

New X-Cell Miniature STORAGE BATTERIES



Modelers who've ordered 'em and flown 'em, say these new X-Cells Miniature Storage Batteries are the cats! You get a *better* spark than the best flashlight cells, and you can recharge 'em from an auto battery to take care of a whole day's flying! You'll sure say "goodbye" to ignition worries, when you get one of these new X-Cells.

FLIGHT BATTERY \$2.75
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BOOSTER BATTERY \$3.75
Adds zip to your power plant.

Yes—

I KNOW IT!

I know we used a Vought Corsair picture over a Thunderbolt a month or two ago. Just wondered how many of you model bugs were reading our stuff. Well—

I sure found out—plenty!



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MODELS

These 35-centers are
joe-dandies! Make
up real-as-life, too!

Don't worry, these
kits have everything
in 'em but the kitchen
stove!

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build—complete
with plans and
parts. (add
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DOUGLAS DAUNTLESS



Scaled 1/4 inch to
foot. Dive bomber
and scout.
Speed 300 M. P.
H. (add 10c
postage)

35c

PLUS A DOZEN OR SO OTHERS

Including:

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P-40, Spitfire, Messerschmitt 109, Stuka,
Jap Zero, N. A. Mustang.

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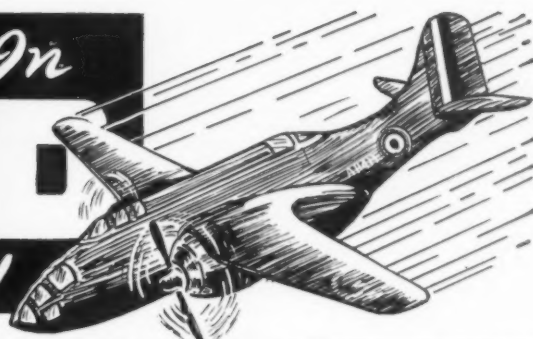
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new in our fan family, we
say "Just ask the man who's
built one!"

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P-47

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Republic's "Flying Battleship"
—Dives at more than 700
M.P.H.! Has 2000 H.P. engine.

It's a beauty!
Scale 1/4" to Ft.



Complete kit
(plus 15c
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Forked vengeance
with "ceiling unlim-
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Terrific Navy fighter!
Claimed dead level
speed of 500 M.P.H.!

Scale 1/4" to ft. Complete kit
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DOUGLAS A-20 A



BRITISH CALL IT
"HAVOC"

But it's so good it has TWO names—the
Yanks call it "Boston." This baby's famous
for taking care of itself in a sky battle, as
well as laying plenty of bad eggs
on the Axis. Scale 1/4" to ft. Com-
plete kit (plus 15c postage) 60c

THE DRAFT AND YOU

We are in a hard war . . . IF YOU ARE 16 or 17 . . . you have the opportunity of a lifetime. Help your country to VICTORY and at the same time TRAIN yourself for a CAREER in Aviation. See Curtiss-Wright Technical Institute ad on page 5—MAIL COUPON TODAY and include your birth date, for vital information.

SUPER-CYCLONE OWNERS

As previously announced, the manufacture of the SUPER-CYCLONE was suspended in April, 1942, for the duration of the war. We have no more engines for sale. The resources of this Company and affiliated Companies are devoted to the winning of our peace. When this is achieved, our engineers will again develop the same high-quality engines we have manufactured in years past.

While, during this period of suspended manufacture, we cannot render to you engine-owners our customary engine repair service we still have many of the replacement items in stock. Send for your copy of our up-to-date Parts List and keep your present Cyclone in service.

TODAY—the makers of SUPER-CYCLONE engines are heavily engaged in war production and aviation maintenance requiring superior craftsmanship and precision. However, when the war is won these same high-quality improved engines will again be available.

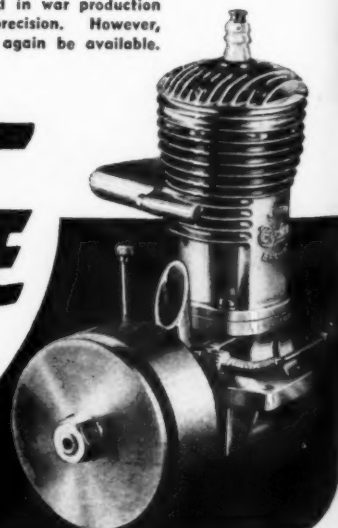
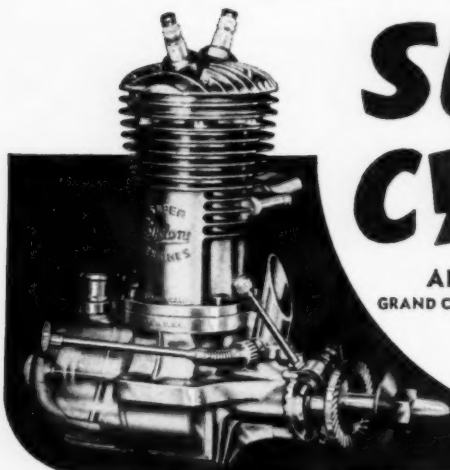
SUPER-CYCLONE

AIRCRAFT INDUSTRIES CO.

GRAND CENTRAL AIR TERMINAL, GLENDALE 1, CALIF.

HOME OF THE FAMOUS

CURTISS-WRIGHT
TECHNICAL INSTITUTE



To All Men in the Armed Forces

You can bet your life no one needs tell you fellows about aviation. You know! No matter what your branch of service, air forces are an integral part of your outfit, making your progress easier, quicker, and more certain. Without air power we probably never could win - but we've got it - and you know will win!

You also know how rapidly aviation has developed - how it has grown from a crawling babe to a charging giant. No sir! You can't stop a good thing like American inventive genius. And it won't stop with the war, either. Peace very likely will bring true our wildest dreams of air progress. The Age of Flight? We're practically there already!

In addressing this letter to you we want you to know that many far-sighted men in the service are planning now for their careers after the war. They are determined to be a part of the most promising industry of the future - Aviation - and to obtain the best technical training to guarantee their success. That's why they have been writing in by the hundreds, many applying for registration, counting on training at Curtiss-Wright Tech just as soon as possible. They are going to get into aviation on the ground floor!

We pass this idea on to you because we sincerely believe it is a good one. Investigate! Send in the coupon! Know ahead of time what you want, and that you're going to get it! And be sure to let us know if we can help in any way.

Best wishes always,
Curtiss Wright Technical Institute

CIVILIANS AND THOSE NOT QUALIFIED FOR ACTIVE SERVICE:

The same up-to-the-minute training so many are counting on after the war is available to you now—TODAY! Take full advantage of your opportunities to prepare for ratings in our Armed Forces and for a life-time civilian career in aviation. Don't Delay. Act! Now!!



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THIS TOWER OVERLOOKS AVIATION'S MOST DISTINGUISHED SCHOOL OF AERONAUTICS

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TECHNICAL**



**WRIGHT
INSTITUTE**

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1229 AIRWAY, GLENDALE 1, CALIFORNIA
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UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, PRESIDENT AND FOUNDER, SINCE 1929

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MAIL TODAY • DON'T DELAY

WITHOUT COST OR OBLIGATION SEND ME FULL INFORMATION AND CATALOG ON THE COURSE CHECKED BELOW

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- ☐ MASTER AVIATION MECHANIC COURSE
- ☐ SPECIALIZED ENGINE COURSE
- ☐ SPECIALIZED AIRPLANE COURSE
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- ☐ SPECIALIZED AIRCRAFT SHEET METAL COURSE
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- ☐ AIRCRAFT BLUE PRINT READING COURSE, HOME STUDY

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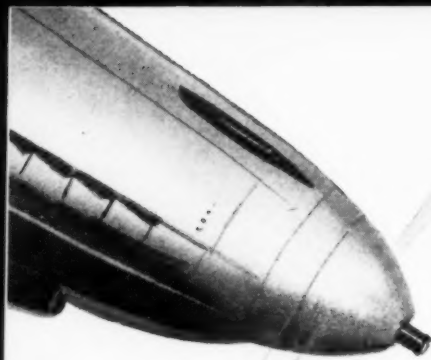
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N-5

DATE OF BIRTH _____



By Flying His Planes, Firing His Guns and Operating His Equipment, We Are Finding Out the Enemy's Flying Secrets

by **TERRY McSHANE**

A YOUNGSTER, playing ball in the backyard, spotted it first and ran into the house with the startling news that a German plane was "up there" diving and zooming in the clear blue sky. His father took a quick glance then called the air raid warden, who called the Civilian Defense head, who ordered the air raid sirens sounded. And a big midwest city in the middle of the hot August afternoon went on its first real alert. This was no test. A Nazi plane was overhead! . . .

It all happened in Dayton, Ohio, when a test pilot from near-by Wright Field took a captured German Messerschmitt ME-109F up for a trial spin to put the ship through its paces and see how good it was. Somebody forgot to tell the people about it, and they proved themselves awake by spotting the German ship before it had been in the air five minutes. The youngster who spotted it first was given a trip to the field and a chance to climb all over the enemy airplane.

But that's just part of the story.

Onto the big station platform at Wright Field near Dayton, Ohio, long box cars filled with shipments that have come thousands of miles from the combat zone are unloading daily—freight consisting of enemy equipment sent here for study by Army Air Force experts so that they can learn what the enemy is using, how good it is, how it compares with our equipment and what we can do to turn out something better that will win in combat.

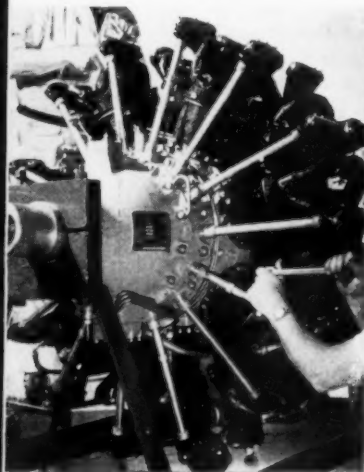
This is the headquarters of the Materiel Command which is so vast that it reaches into every training center, every factory, every air field and every war zone where our Air Forces are fighting. It buys the warplanes that its engineers have designed and its production geniuses have supervised into production. Here planes are born on paper and in wind tunnels; and here the finished products are tested and tested again. Last year it was a forty billion dollar job, and this year it will run that and half again. This is the center

of U.S. air power—Wright Field—named for the Wright brothers, who more than a quarter of a century ago practiced with their gliders over the very same land that today is the site for the hundreds of buildings, shops, hangars, test facilities and flying field, the world's greatest aeronautical, scientific research center.

Part of the job is to study the enemy, to answer these questions: How fast will the Messerschmitt 109G fly? How maneuverable is it? How does it compare with our own Lightning P-38? What kind of metal is going into Jap plane construction? What are Junkers engines made of? What kind of bullet-proof tanks does the enemy have? How good are German and Japanese radios, bomb-sights, etc.? What about foreign instruments? What are the enemy's weak points?

If structural experts, armament technicians, electricians, aircraft designers, metallurgists and test pilots can learn these answers on the ground and in the

Technical Data Laboratory engineers analyze captured foreign equipment. At left is an Italian 870 hp Fiat A.74 R.C. engine being disassembled. Center is Messerschmitt Me-109F fighter examination. At right, Arado Ar-98 propeller with strange spinner.





At left is captured Junkers Ju-88A-6 with Wright Field test engineers at the controls. Mitsubishi Zero, at right, is actually parts of several Jap planes assembled into a flying machine. Actual performance and maneuverability data is obtained in this manner.

air, it may decide the outcome of many an air duel over some far distant front before it is fought. That can mean giving some American boy the edge over a Jap in a Zero somewhere over the New Guinea jungles; it can mean that Johnny, the sergeant gunner in a B-17 over Germany, will know where to send his tracers when a Focke-Wulf attacks; the difference between coming home . . . and a flaming death. Or it can mean the discovery of some new important gadget that might be adapted to our own airplanes to make them even better fighters than they now are.

Specifically the task has been assigned to Lieutenant-Colonel J. M. Hayward, a big military looking man with a broad grin and a keen mind, who heads the Technical Data Laboratory of the Materiel Command—the archives of the Army Air Forces from the Fort Myer crate to the Boeing Flying Fortress. More generally this is the job for all of Wright Field's ten laboratories of its Engineering Division which covers everything pertaining to aircraft from the shape and style of a bombardier's glove to the contour of a giant bomber's wing or the section on a helicopter's blade. Each has its specific task with the result that they probably know as much, if not more, about some German and Japanese planes and their auxiliary equipment than the men who built them.

Says Colonel Hayward: "Learning the relative merits of the enemy is as important to the combat flyer as knowing the merits of his own airplane. It's like stealing the plays from the opposition quarterback the night before the big football game."

It's not easy to get enemy equipment. For some reason the Japs and Nazis are hesitant to let their planes and parts fall into our hands. That, in itself, is a difficult procedure. But long before the U.S. got into the thick of things, Wright Field men were setting the wheels into motion. They knew how important the whole idea was, for in the last war some of them at old McCook Field, predecessor of Wright, had flown German Pfaltz fighters and Fokker triplanes sent over here; they knew that what they had learned from the enemy craft helped French, British and American aces like Rickenbacker, Fonck, Campbell, Bishop, Guynemer and others to shoot down many a German plane over France.

They selected a specially trained Intelligence group, officers who went through a grinding, intensive training course in which aircraft specialists taught them all about planes and what to look for in the enemy. These men were then sent to the various fronts, and each man's sole job was to scrutinize and inspect every crashed enemy plane or piece of aeronau-

tical equipment. Their trained eyes were quick to spot any new development of the enemy, and coded messages described it in detail. Then, too, they requisitioned some of the captured equipment, crated it, put a priority on it and sent it to Wright Field for actual evaluation tests. That's how it began—with the never-ending line of enemy equipment that comes to the field: engines, radios, machine guns, cameras, gas tanks, clothing and complete enemy aircraft.

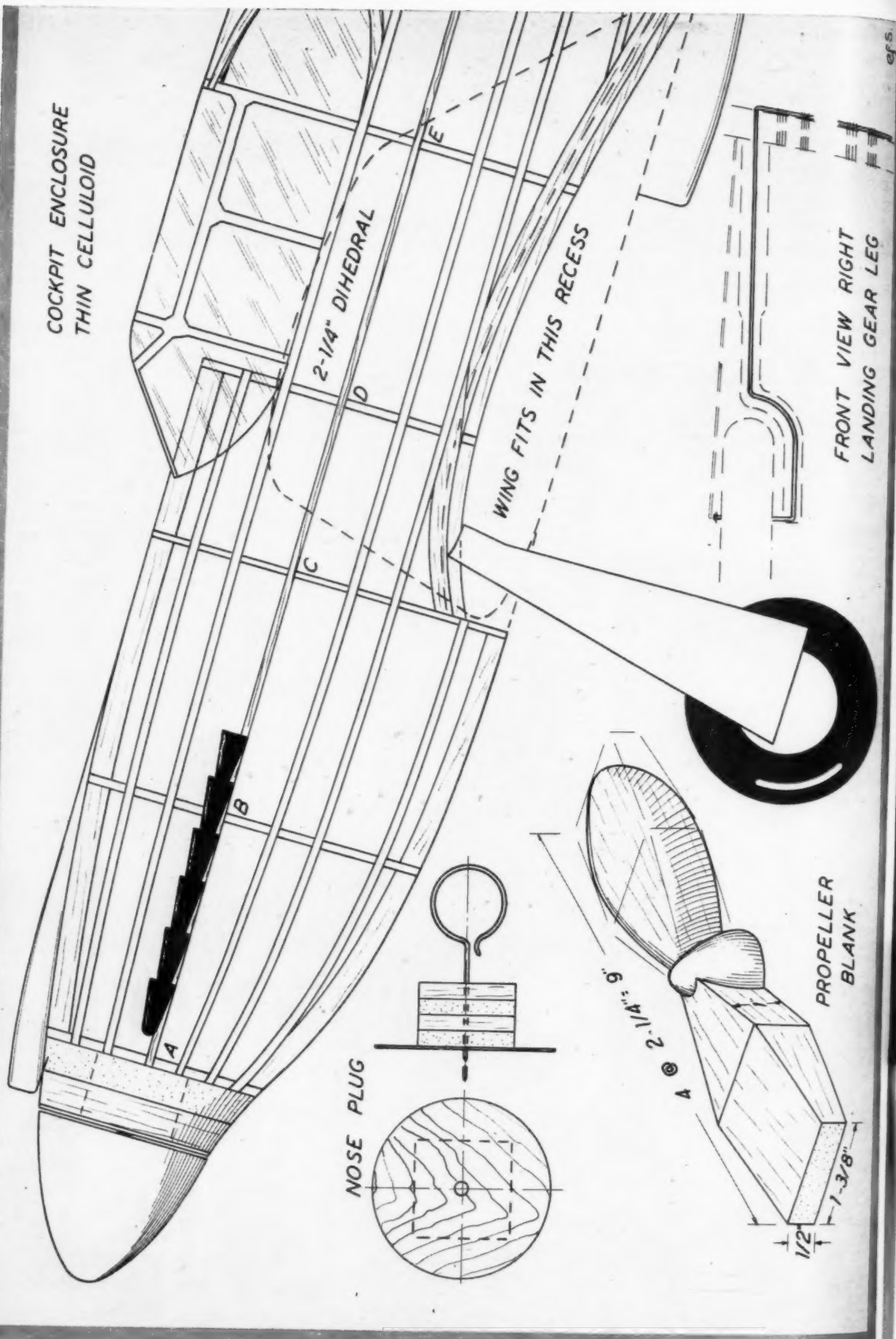
Since war came to the world in 1939, Wright Field engineers have received knocked-down German Messerschmitt fighters—models Bf. 109 and Me. 110—together with auxiliary equipment captured or salvaged. They have put them together, disassembled them, crushed them under giant hydraulic presses to see how tough they were, run the engines on big tests for hundreds of hours in rain, snow and sleet, and put them through a gruelling flight test routine; no tougher, but longer-lasting than the flight tests given our own fighting planes by the same test pilots.

Most dramatic are the flight tests, which however do not always reveal what the enemy has that is best, for his secrets, which are few, are well hidden. These may include a new metal for construction of a highly sensitive instrument, etc. In flight, such characteristics may not show up. Test pilots look forward to flying an enemy plane, often drawing lots to see who will get the honor. And it is not an uncommon sight to see some of the Army's crack test pilots dog-fighting it out at ten thousand feet—a lone Messerschmitt, Junkers or Zero in the midst of a swarm of Bell Airacobras, Curtiss Kittyhawks, Republic Thunderbolts or Lockheed Lightnings. Occasionally two or more of the Nazi planes will attack a big Fortress and camera guns will click as waist gunners test the big bomber's new defense positions against attack.

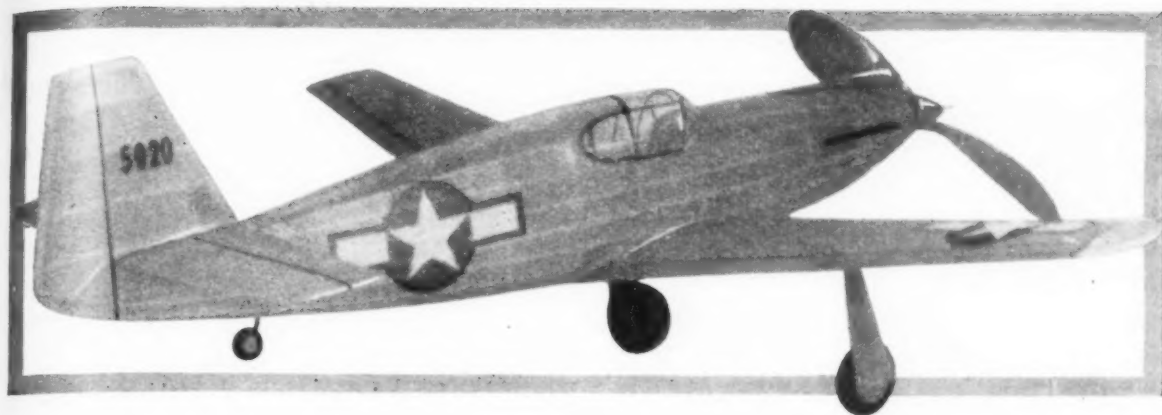
By now the people on the ground are accustomed to these scenes and they pay little attention except that they like to point them out to strangers and brag somewhat along these lines: "See, that's

(Turn to page 34)

HOW GOOD is the ENEMY?



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MODEL MUSTANG

by **EARL STAHL**

THE North American P-51B Mustang featured on our cover this month (see page 25) is of ideal layout and its favorable design makes it highly satisfactory for a scale model with good flying qualities.

The plan is for a balsawood model, but if the builder is unable to obtain sufficient balsa for the whole job, pine or similar material may be substituted without impairing the model's flying ability.

Conventional construction methods are followed. Be sure to do the work neatly and accurately, and exercise care to cement all joints firmly. Where pine or other such wood is substituted, the thickness of the part should be reduced since the material is stronger.

CONSTRUCTION—Full size plans are presented, and with the exception of one wing and stabilizer half, no redrawing will be necessary; work right over the plan to simplify and speed construction. Make the wing first. It is built in two halves which are later joined. Ribs Nos. 1, 2, 3 are 1/16" thick balsa while the others are 1/32". Cut and sand the ribs carefully to exact shape. The leading edge and spar are cut from sheet balsa and are tapered as indicated. Assemble the parts over the plans using pins to hold them in place; cement the joints solidly. Trim the leading and trailing edges as well as the 1/8" sheet tips roughly to shape; then sand the whole structure.

Use of the keel and bulkhead method simplifies the fuselage construction. Cut two of each bulkhead from 1/16" sheet. To assemble, pin the top and bottom keel in place on the side view and attach the half bulkheads. Add the side keel, and when this structure is dry remove from the plan and add the remaining bulkheads and keel. Now place the 1/16" sq. stringers starting nearest the side keel; be careful to keep from disaligning the frame by adding a stringer to each side at the same time. Cut the notches as required, and be careful to align them perfectly.

At the recess for the wing, curved pieces of 3/32" sheet are required. They are similar to the center keel in shape and they should fit the curvature of the

wing neatly. Two pieces of 1/4" sheet cemented together form the nose block; roughly cut it to shape before cementing to bulkhead No. 1. Note that the center of the nose block is cut out to receive the nose plug. In the rear where the rubber holding bamboo pin is mounted, attach the hard 1/16" sheet retainers. For the curved windows behind the pilot's cockpit a frame is required; it is carved from several pieces of sheet balsa.

On the real P-51 a radiator is mounted under the belly. This was eliminated on the original model in the interest of better flights. Those desiring maximum scale will want it, however, therefore crosssections are shown. It may be of built-up construction or hollowed out from a solid block of balsa. It is best to leave the radiator off until the wing has been covered and is assembled to the fuselage.

Rib construction of the stabilizer and rudder is shown in the sketch. Make flat frames of each (the stabilizer is built in one piece) using 1/16" thick stock for the outlines and 1/16" sq. for spars and ribs. When these flat frames are dry, remove from the jig and attach 1/16" sq. strips to both sides of each rib. These are later cut to the streamline shape shown. Trim the leading and trailing edges to conform to the rib shape.

A simple but highly practical landing gear is featured. Using .040 music wire, bend the front view as shown by the full size plan; then bend the top of the wire so that it joins the rib and spar as shown. Be sure to make a right and left leg. Using a needle and thread, bind the wire to the structure and sew right through the rib. Cement the thread and adjacent areas thoroughly to strengthen the structure. Wheels may be purchased but it is a simple task to make them from laminated sheet balsa. Fix bearings to both sides of each wheel so they will revolve smoothly and accurately. Other details of the landing gear will be completed later.

A hard balsa or soft white pine propeller is recommended. Cut the blank to

the shape and dimensions shown. It is best to make the spinner separate. Drill the tiny prop shaft hole first, then cut away the back surface of the blank until the camber is as desired. Now cut away the front until the blades are of the desired thickness. Round the tips and reduce the depth of the hub as indicated. Blades are brought into balance by sanding. The spinner is soft balsa and may be made in several pieces to fit, or as one unit and notched to fit over the hub.

The nose plug is detailed on the plan. It consists of a 1/32" plywood disk backed by several laminations of 1/8" sheet. Drill the hole through it slightly to the right so there will be a few degrees of right thrust. Washers are cemented to both the front and back to fix the line of thrust. Music wire .040 thick is used for the propeller shaft. For best flights a freewheeling gadget that will permit the propeller to spin freely in the glide is recommended.

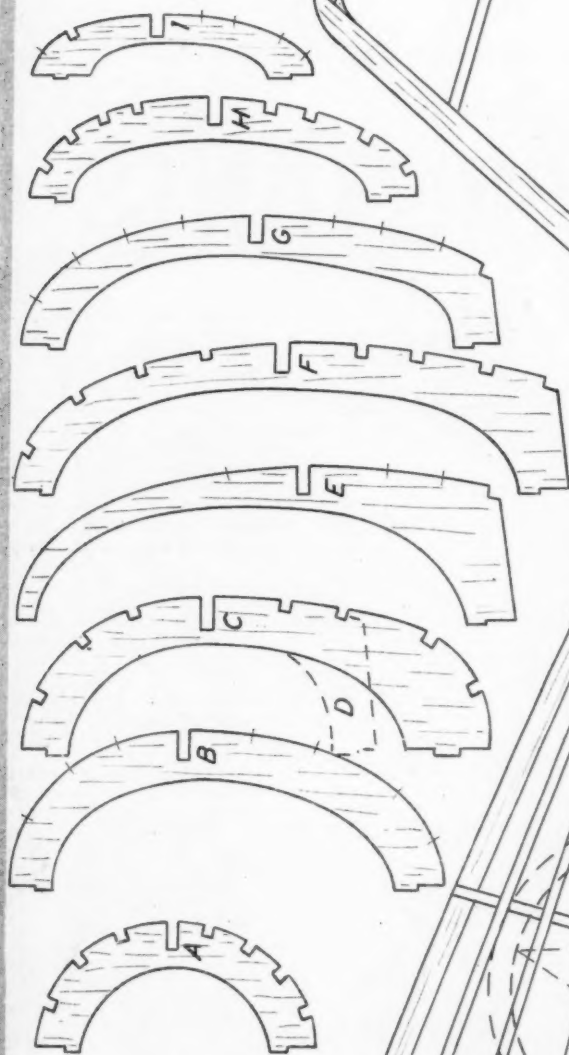
Before the frames are covered they must be sanded to perfection or else a good job can not be made. Colored tissue is suggested and it may be attached to the frames by banana oil or light dope. Use a separate piece of tissue for both sides of each wing and stabilizer half. For the fuselage numerous small pieces neatly lapped will be required to avoid unsightly wrinkles. Water spray the covering lightly to tighten it. Fix the flying surfaces in a level position while drying so they will not warp but do not apply any dope until later.

Assembly of the parts must be done with accuracy. First fit the wing within the recess and cement it fast. Align the stabilizer with the wing and then finish the area from fuselage to it with scraps of balsa and tissue. Attach the rudder perpendicular to the stabilizer, off-setting the front of it about 1/32" for a right turn. Now one or two coats of light dope can be brushed on the covering to tighten it.

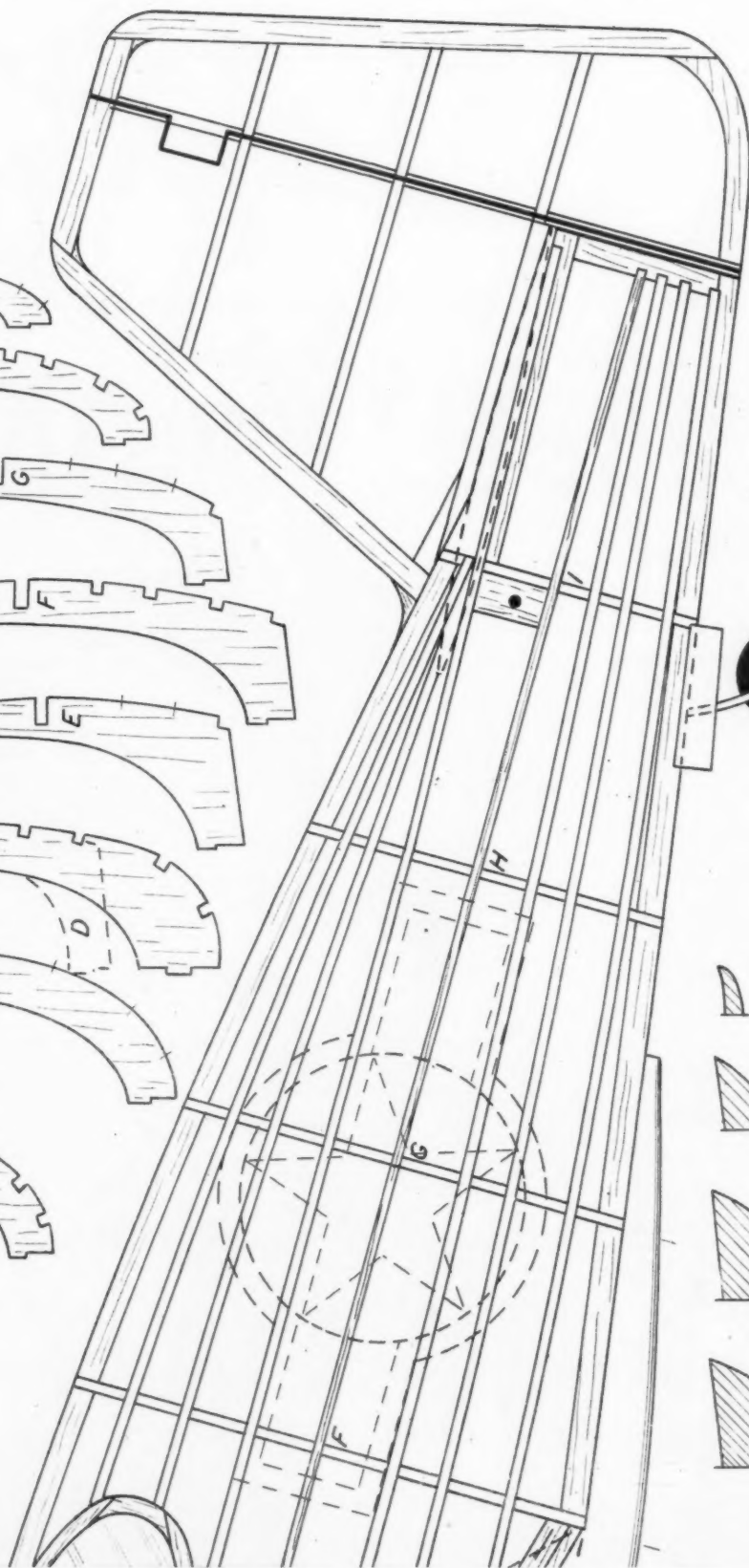
Addition of the various details completes the construction. Thin celluloid is used for the cockpit enclosure; it may be obtained from cleaned photo film. Structural details of the enclosure are represented by thin strips of black tissue

(Turn to page 46)

IF PINE OR
SPRUCE USED,
REDUCE SIZES

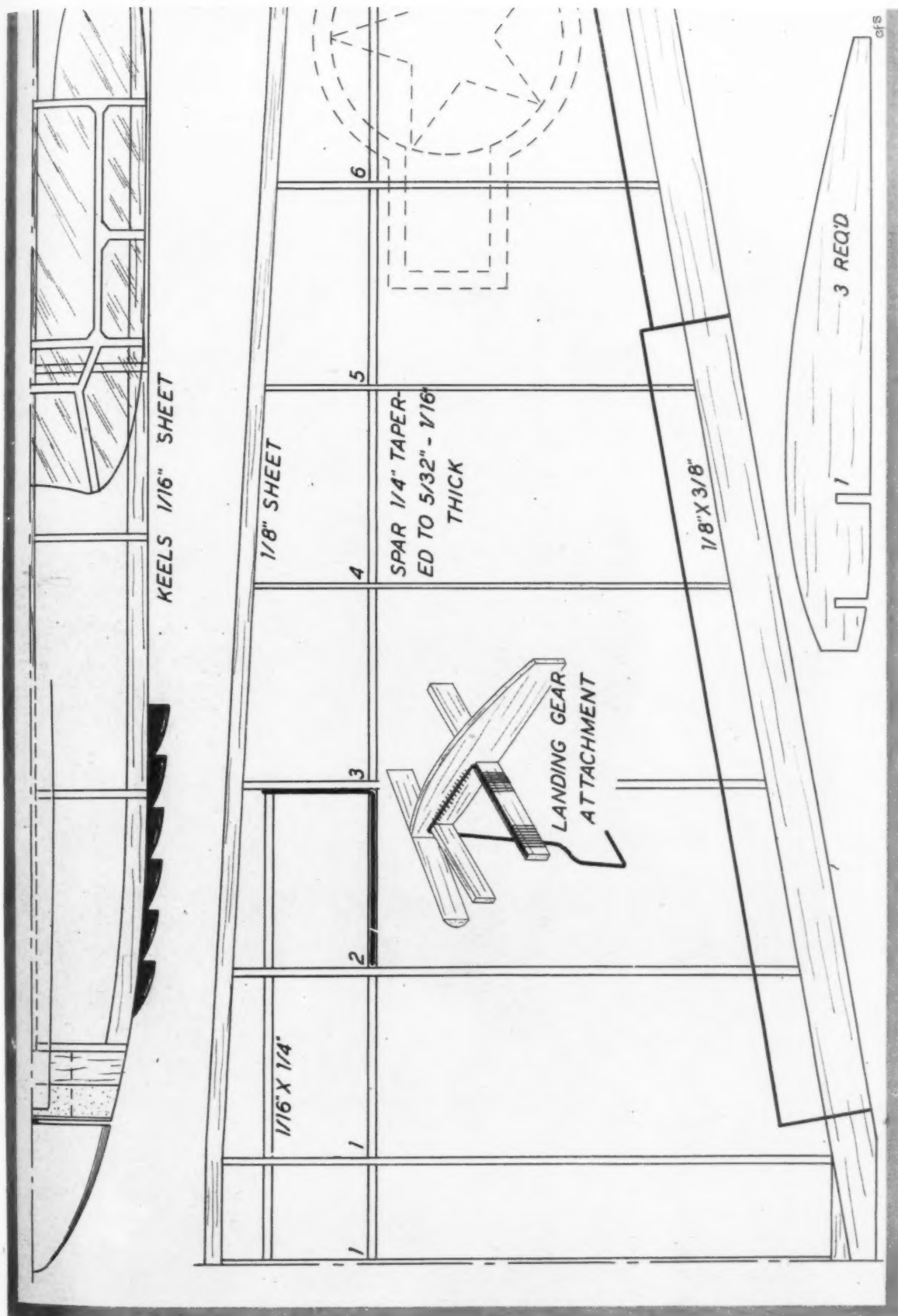


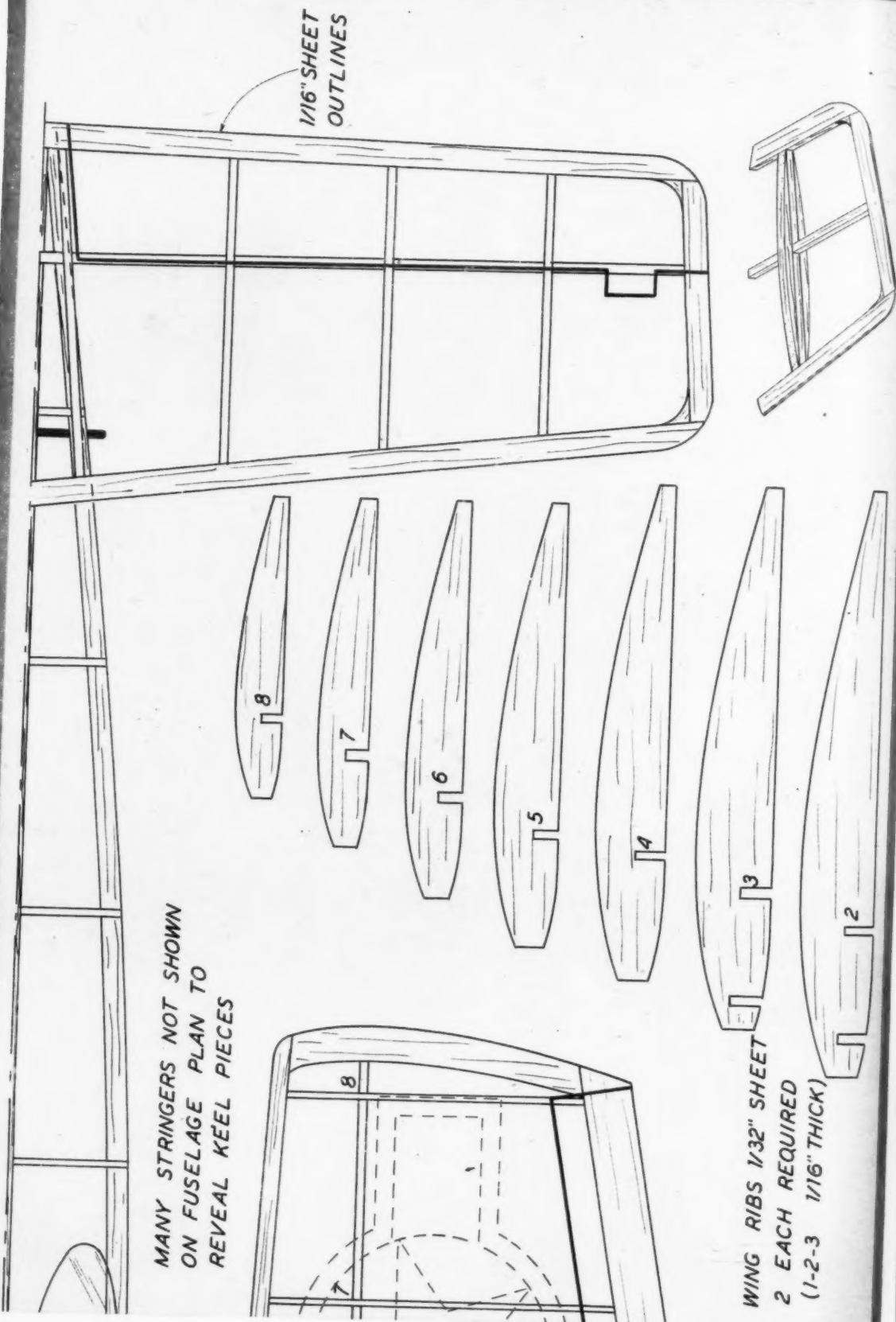
BULKHEADS
1/16" SHEET
2 EACH REC'D



RADIATOR CROSS-SECTIONS

P-51 MUSTANG BY EARL STAHL





AIR WAYS



No. 1 Walter Fitch of Buffalo, New York, built this finely detailed solid scale model Supermarine *Spitfire* II fighter

ACCORDING to Napoleon an army travels on its stomach. According to a popular song, the infantry travels on its ones and twos. And according to a friend of ours in the Tank Corps, an Army travels on its basic understanding. However, the point is that an Army *does* travel and members of the armed forces are covering more miles in a few days than many ever dreamed they would cover in a lifetime. We have had the good fortune to play host to hundreds of men in the service here in the offices of MODEL AIRPLANE NEWS. It is not unusual for us to have talks with a dozen men from the scattered points of the globe in a single week. We have talked with modelers from Canada and Scotland, from South Africa and Brazil and one chap spent an afternoon enlightening us on model activities in his home town: Melbourne, Australia. To all modelers in the armed forces we extend a cordial welcome to visit us when you pass through New York City (and sooner or later you're bound to, if past experience establishes a rule) en route to or from your stations. If we had our way we

(Turn page)



No. 2 Armand Swenson's original design amphibian with hydroplane type hull design



No. 3 This sport plane has gone contest wise according to its builder. Leonard Moskowitz tried new airfoil with great success



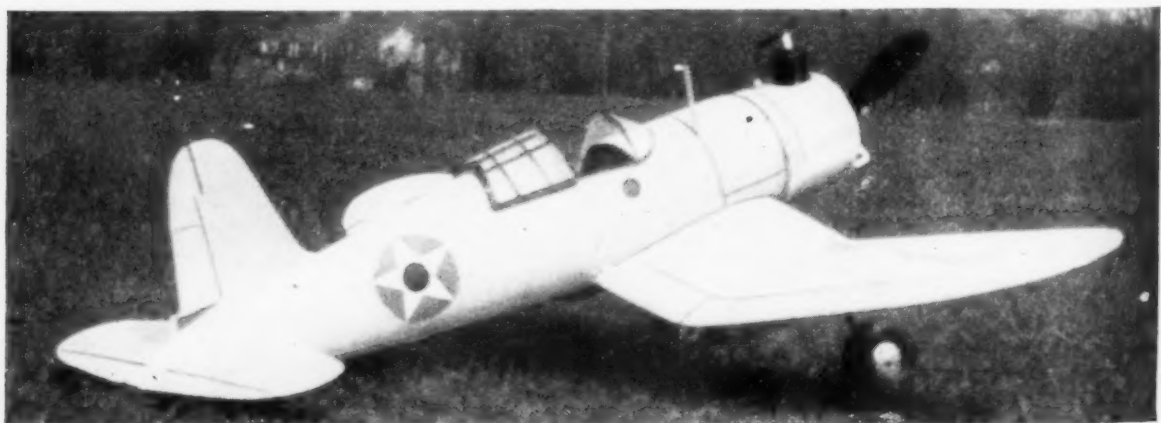
No. 4 Bill Lovelace built this Consolidated *Catalina* PBV from a 15c kit but added a few of his own ideas. Result: nice job



No. 5 Messerschmitt Me-109F is the work of Nelson D. Wight, Jr. Movable controls, too



No. 6 Wight's pride and joy is this Grumman *Wildcat* with 3500 rivet punches in its skin



No. 7 Lee Herscher has proved that a control-line job can look like the real thing with this Vought *Corsair* Navy fighter

would meet and talk to every reader of the magazine, exchange ideas, tell experiences, enlarge on fantastic ideas for new projects. We like to feel that *MODEL AIRPLANE NEWS* is more than a magazine; that it is an institution designed wholly for the development of model aviation. Through the free exchange of ideas you are helping us to help you. So if you find yourself at Grand Central or Pennsylvania Station with a minute to spare, hop a cab to 551 Fifth Avenue (just a few blocks). We'd like to see you.

Don't ever feel that model building is the exclusive possession of 'teen agers for Walter Fitch has been building them since 1912 and he says that his latest, the *Spitfire* II, shown in Picture No. 1 at the head of this month's *AIR WAYS* department, is his best scale model. We cannot stress too highly the unbeatable combination of good model building and good photography, and Walter's *Spitfire* represents what can be achieved in the perfection of both of these items. He is employed in the Experimental Flight Test Department of the Curtiss-Wright Corporation and soloed on August 26th, 1927. He has gotten in considerable flying in the past 17 years. About his *Spitfire*, he says it was built in seven months and about 700 hours of work went into it. We'd like very much to hear more from you, Walter, with such fine work.

Armand D. Swenson of Seattle, Washington, sends in Picture No. 2 and speaks a strong word for "three-point suspension" float hulls. In this type, the hull bottom is concave along the main step and only small chine surfaces contact the



No. 8 Curtiss Warhawk P-40 fighter model was built by Leslie Inman, Oakland, California, from plans appearing in M.A.N.

water. This theory has been applied with outstanding success to hydroplane racing and Armand believes that its use in model seaplanes, particularly in large, heavy jobs, would increase performance. About his model, it has a span of 5 feet 3 inches, a real thick airfoil and lots of area. It flies equally well off land or water and this may be one of the first control-line seaplanes ever operated. If there have been others, we'd appreciate news of them.

Picture No. 3 comes from Leonard Moskowitz of 225 Parkside Ave., Brooklyn, New York, and shows a photo of his very fine gas job which "started out to be a sport plane but may develop into a fairly good contest ship." Leonard became curious about reflex wing sections (upturned trailing edge) and, at first, he met with little success. He then tried it on a modified version of Megow's *Cadet* and found that it increased the stalling angle and gave the ship more speed. Although he says that speed was the one thing he didn't need, the new section makes the model soar and he has had 15 minute flights with a Class "B" engine, which isn't bad at all. The use of reflex trailing edge airfoils greatly increases the longitudinal stability of the model as this

(Turn to page 56)



No. 9 Navy builder E. J. Kress' Stinson Reliant could easily pass for big ship in flight



No. 10 A completely detailed solid scale model Grumman Wildcat with built-up P&W engine is the work of Albert Putzer



TETHERED TORNADO

by CHARLES ZIEHL

**This model
may never break
a speed record
but it'll
teach you the
tricks of the trade**

WHEN U-Control models first appeared we were part of the many who were skeptical as to their merits, but eventually we too began tying strings to our old models. These converted "goats" were good for many hours of fun, but since they were not built especially for control line flying they couldn't take some of the violent "maneuvers" we put them to during our training period. After picking up the pieces we would start home swearing never again to touch another plane that had any "strings attached," but alas, another "goat" would always pop up out of nowhere to haunt us until we tried it.

Our first attempt to build a model especially designed for control line flying ended, sorry to say, as our "goats" had—on the scrap pile. But even with this inglorious ending this model taught us plenty about control line construction. This ship employed the same type construction as our free flight models, but it proved highly inadequate as far as strength was concerned since a guide liner has to take much more punishment than an ordinary gas job. With the beginning of the balsawood shortage, basswood came into the limelight and this proved to be the answer. A carved basswood fuselage and a semi-basswood wing combined with a good strong landing gear gave us our first really successful and durable guide liner.

The model presented here is the result of many basswood experiments. It is de-

signed to fly and is not a weight on a string that is an airplane in name only. It has a calculated speed of 45.5 mph. for steady level flight with neutral control, so you can see it isn't a speed demon but merely a model that will provide hours and hours of enjoyable controlled flight since it is practically indestructible.

Well, if you've read this far I guess you're interested, so let's get down to work on the:

FUSELAGE—The fuselage is made of two basswood blocks $1\frac{1}{2}$ " x 3" x 22" in size. Glue the 3" faces together with a sheet of paper between them so they can be split apart again after the outside is shaped. The easiest way to do this is to mount the glued-up blocks in a lathe and turn them down to the dimensions on the plan. If you don't own a lathe, a little shopping around among your modeller friends will usually disclose one hidden away in somebody's cellar or workshop, so get out and start hunting.

If a lathe is unobtainable, don't give up; you can still build this model! Carve it by hand. Sounds gruesome doesn't it? But it isn't as bad as it sounds for you can inject a little originality into the model if the fuselage is made this way.

If the cigar-shaped fuselage or the round crosssection doesn't appeal to you, they may be altered. You can try putting a cabin or a cockpit on the fuselage. Only one word of warning: don't change the fuselage too radically and do not change the setting or location of the

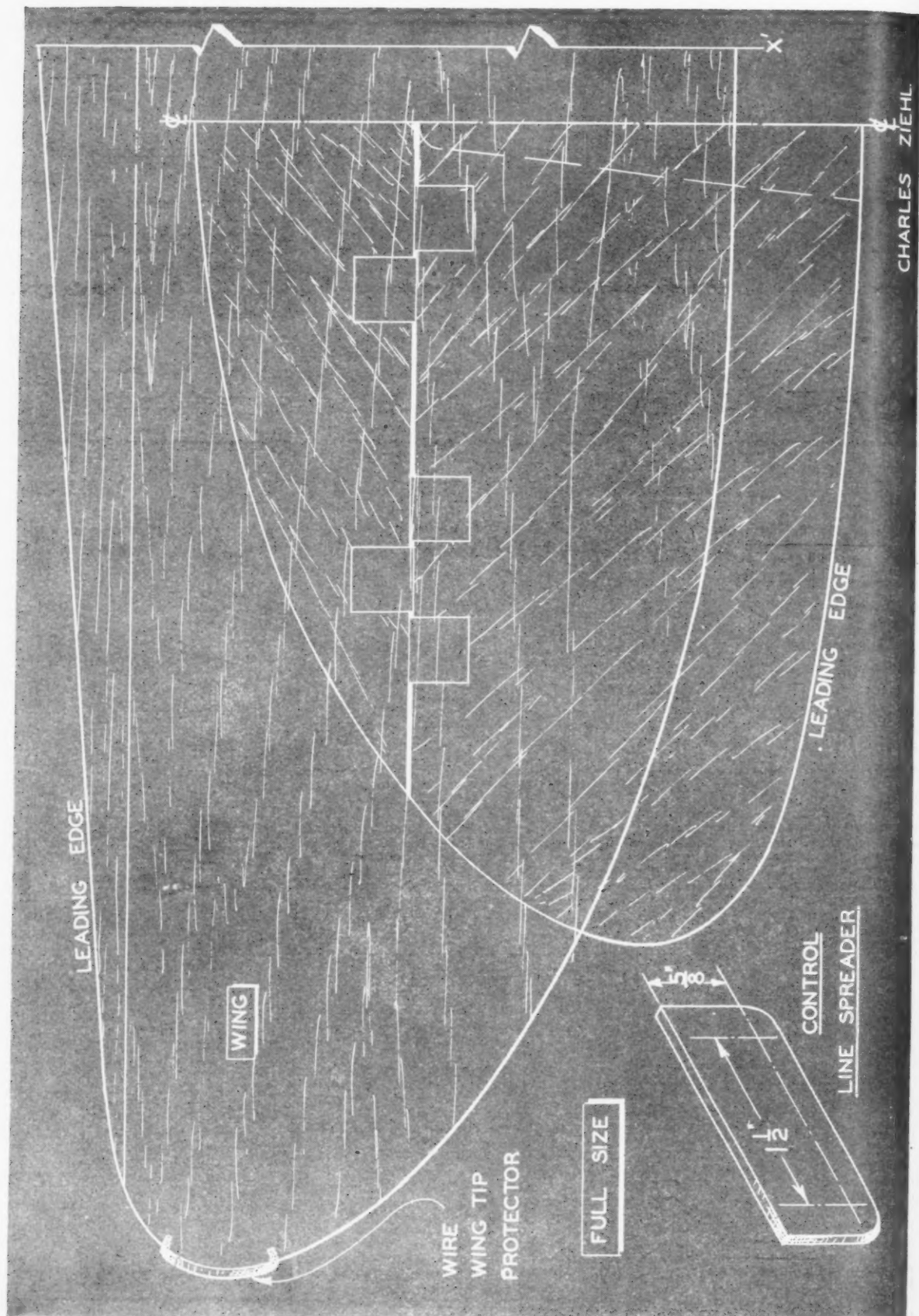
wing, tail or motor! Many set-ups have been tried and these shown were found to be the most efficient.

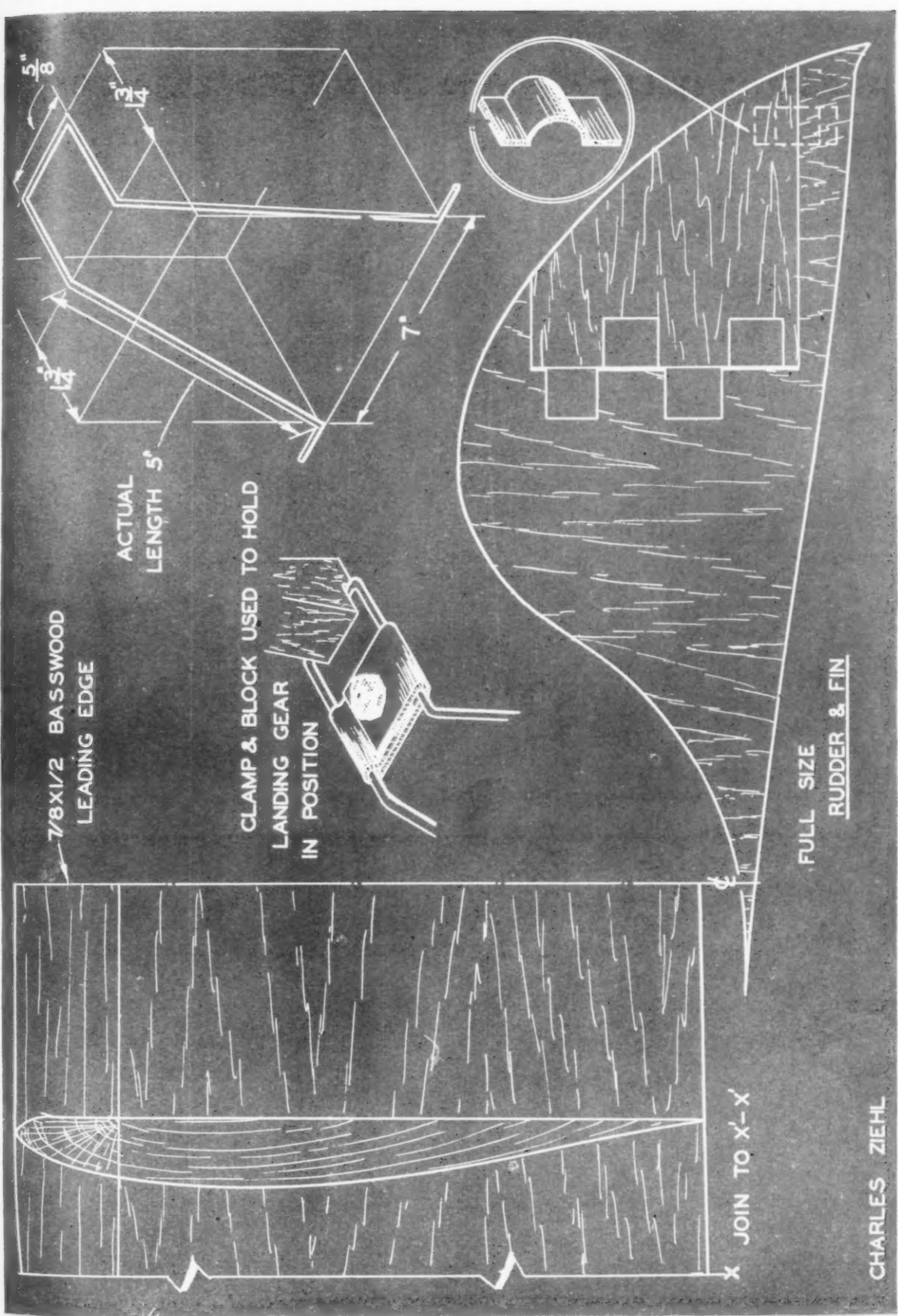
Now back to the fuselage. After the outside is shaped, a thin knife is forced into the paper at the glued joint. A little pressure on the knife will split the fuselage into two neat sections ready for hollowing out. This is done with the use of gouges and a mallet. Carve from the ends toward the middle and don't take too heavy a shaving. When the fuselage is about $\frac{3}{8}$ " thick, discard the mallet and begin hitting the gouge with the palm of your hand. Carve the entire upper half of the fuselage to about $\frac{3}{16}$ " wall thickness. The rear of the lower half has the same thickness but the front is left partially solid. Leave the underside of the fuselage, where the landing gear is attached, as heavy as possible so that the gear has a good solid setting.

LANDING GEAR—The landing gear is bent of 1/8" steel wire. It must be inserted into the two holes in the fuselage before bending out the small ends that act as axles for the wheels. Bend up a landing gear clip as shown and bolt the gear down with it. A small block glued into position over the back wire of the gear completes its installation. The wheels are $2\frac{1}{4}$ " in diameter and are the streamlined sponge rubber type, if you can get them. Incidentally, if you intend doing much flying off a field that is not too smooth you had better try the balloon-type of wheel first since it is a little easier to get a ship off with them.

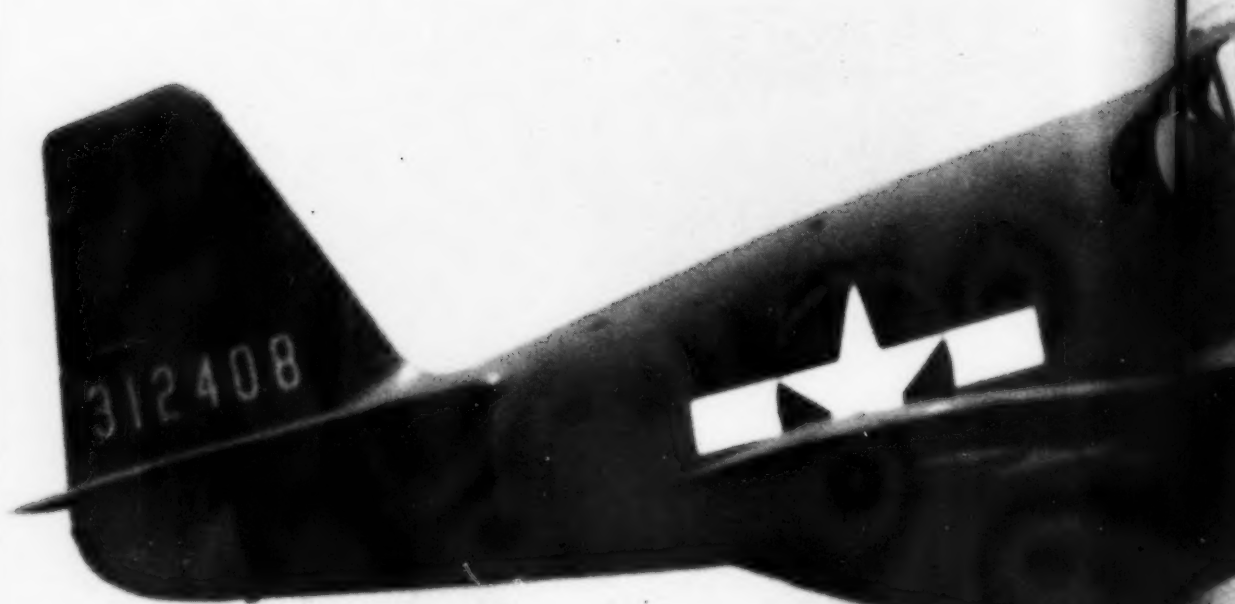
MOTOR MOUNTS—The motor mounts are $1\frac{1}{4}$ " x $\frac{3}{8}$ " hardwood if a "Forster 29" is used. This locates the thrust line on a common axis with the center line of the fuselage. If you intend using another engine, vary the

(Turn to page 52)





AIR AGE FRONTIERS



North American Aviation's *Mustang* P-51B climbs fast to 40,000 ft. ceiling. Capable of 400 mph, it is world's top fighter



Monster Douglas B-19 *Hemisphere Defender* is largest ever built. Wright Field flies it as test laboratory for newer bombers



With 600 mile fighting radius, *Mustang* fighters accompany bombers through to Berlin. For complete details turn to page 25



First photo of new Japanese Nakajima S-03 known as *Tony* by U. S. Marine fighters. Developed from Macchi C-202, it is deadly

Model Airplane ENGINE PERFORMANCE

**A thorough analysis of model airplane engines
and a comparison of their engineering features**

STARTED as a hobby and carried forward by the manufacturer, model airplane engine development progressed to the point where a number of models were being built on a quantity basis when the order came to freeze production. Advance in the design of large aircraft engines has been rapid and interest is attached to an examination of how the performance of the model engine compares with that of its larger brothers in the full-sized field of aviation.

In making performance comparisons considerations of particular importance are the weight of the engine in relation

to its power and the power of the engine in relation to its size, that is, its total piston displacement. Figures on the weight per horsepower and the horsepower per cubic inch of piston displacement for a number of two-cycle, or more accurately speaking, two-stroke-cycle model engines appear in the table below. These figures are based on the rated horsepower of the engines as given by the makers. The engines are listed in the order of their piston displacement, starting with the smallest. It should be understood that these figures are for the purpose of making relative comparisons.

The weights of the different engines are compared on the basis of a one horsepower output, and the power on the basis of one cubic inch of piston displacement. Actually, of course, none of these engines develops as much as one horsepower, and all models, with one exception, have a piston displacement of less than one cubic inch.

It will be noted that the weights of these miniature engines range from 1.25 to 3.12 lbs. per hp. Specific weights in the neighborhood of 1.25 lbs. compare favorably with those of large four-cycle radial aircraft engines of modern design.

The hp. per cu. in. of displacement developed by the engines listed ranges from 1.020 to .386. It will be noted there is a very marked correlation between the variation in the cylinder piston displacement and the specific output. That is, as cylinders grow smaller there is a general tendency for the specific output to increase. Multiple cylinder engines may have a relatively large total displacement, but if the individual cylinders are small the specific output will be high. The Class C Elf Four, for example, has a total piston displacement of .388 cu. in., but it is made up of four small (.097 cu. in.) cylinders and develops the high specific output of .859 hp., the same as the single-cylinder Elf Class A model. Large four-cycle aircraft engines of efficient design develop about .650 to .750 hp. per cu. in. of displacement or less than some of the miniature engines listed.

Due to war conditions, reliable information on the maximum horsepower of miniature engines as obtained from brake tests is difficult to obtain. Forster Brothers, however, have cooperated by furnishing this information for their model "29" Class B engine. This engine has a maximum output of .224 hp. at 8,600 r.p.m., which is about eleven per cent higher than the rated horsepower. At this maximum output the weight per hp. is 1.60 pounds and the hp. per cu. in. of piston displacement is .754.

Since model engines operate on the two-cycle principle, it is of interest to investigate how they compare in performance with larger two-cycle aircraft engines. The table on the opposite page gives the specifications and performance data of some two-cycle engines for small light planes which were used to some extent by civilian fliers before the war, especially in England and Europe.

Four of these engines are of the two-cylinder-in-line type. The Scott A.25 three port engine, built by a British manufacturer specializing in two-cycle engines, shows the highest performance characteristics of the engines in the list, 2.50 lbs. per hp., and .856 hp. per cu. in. of displacement, based on the maximum

DATA ON MODEL TWO-CYCLE AIRPLANE ENGINES

	Class	No. Cylinders	Piston Displacement	Stroke-Bore Ratio	Revolutions Per Minute	Horsepower	Bare Engine Weight, ozs.	Rated hp. per cu. in. piston disp.	Weight per rated hp. lbs.
Elf Single	A	1	.097	1.21	8000	1/12	3	.858	2.25
Super Atom	A	1	.098	1.00		1/10	2	1.020	1.25
Megow	A	1	.191	1.00		1/7	3	.748	1.31
Elf Twin (Opposed Cyl.)	A	2	.194	1.21	8000	1/6	5	.859	1.87
Ohlsson "19"	A	1	.199	.77	7000	1/7	4	.718	1.75
Ohlsson "23"	B	1	.230	1.10	7500	1/6	4 1/2	.725	1.69
Rogers "29"	B	1	.291	.69	7500	1/6+	4 3/4	.567+	1.78—
Forster "29"	B ₂	1	.297	.90	7200	1/5+	5 3/4	.673+	1.80—
Rogers "35"	C	1	.350	.63	7500	1/5	4 3/4	.571	1.48
Elf Four (Opposed Cyl.)	C	4	.388	1.21	8000	1/3	9	.859	1.69
G.H.Q.	C	1	.518	.80	7000	1/5	10	.386	3.12
Ohlsson "60"	C	1	.600	.93	7500	1/4	9	.417	2.25
Atwood Champion	C	1	.603	.97		1/4	10	.415	2.50
O.K. Special	C	1	.604	1.06	5675	1/4	7 1/4	4.12	1.81
Super Cyclone	C	1	.647	1.00	7000	1/4	7 1/2	.386	1.87
Forster Super 99	C	1	.997	1.06	6000	1/2	15	.502	1.87
O.K. Twin (Opposed Cyl.)	C	2	1.208	1.06	6000	1/2	22	.414	2.75

Maximum Horsepower of a Model Aircraft Engine Obtained by Brake Test

Forster "29": r.p.m. 8600; maximum brake hp. .224; maximum brake hp. per cu. in. disp. .754; weight per brake hp. 1.60 lbs.

and DESIGN

by
**EDWARD G.
INGRAM**

DATA ON TWO-CYCLE LIGHT PLANE ENGINES

	No. Cylinders	Cylinder Arrangement	Displacement	Stroke-Bore Ratio	Revolutions per Minute	Brake Horsepower	Engine Weight	Displacement per cu. in. of Piston	Weight per Horsepower
Aubier & Dunne "Chan."	2	In-Line	32.9	1.00	4000	20.0	38*	.608	4.25
Scott A.2S	2	In-Line	39.7	1.07	5200	34.0	85*	.856	2.50
Koller M.3	2	Horiz. Opp.	39.8	.96	2700	18.5	59	.465	3.19
Fesenberg-Pakisch W.2	2	In-Line	60.0	1.67	1800	30.0	84	.500	2.80
AVA H4	4	Horiz. Opp.	65.8	1.00	2800	28.0	82	.426	2.93
Tiger Kitten 30	2	In-Line	77.3	.93	3000	30.0	75*	.388	2.50

*Including built-in reduction gear.

brake output. The Tiger Kitten 30, an American-built engine, has the same power-to-weight ratio but a much lower specific output. Features of the German Fesenberg-Pakisch W.2 engine are a very long stroke, stroke-bore ratio of 1.67, and the crankshaft type of rotary crankcase inlet valves. The Aubier and Dunne Channel, of French manufacture, was the first two-cycle engine used to propel a plane across the English Channel, and has been used quite extensively for light planes. The performance figures indicate it is quite heavy for its power, however.

An example of a two-cylinder opposed two-cycle engine is found in the German Koller M.3. The AVA H4 is a four-cylinder opposed French engine provided with rotary crankcase inlet valves.

It will be seen that the Forster "29" miniature engine has a lower weight for its brake horsepower output than any of these engines and that its hp. per cu. in. of displacement is nearly as high as the Scott A.2S.

Engines with small cylinders tend to operate at high speeds. Several Class A engines are said to be capable of running 20,000 r.p.m. A single-cylinder O.K. model equipped with a flywheel and rotary crankcase inlet valve is stated to operate at from 10,000 to 15,000 r.p.m. Such speeds, however, may be above the point where maximum power is reached, that is, beyond the peak of the power curve.

As compared with a third port, the rotary crankcase inlet valve makes it possible to about double the period during which the charge enters the crankcase. It also permits an engine to be throttled down to lower speeds without irregular running. Rotary valves of the crankshaft type are used on the Forster "29," Atwood Champion, Super Cyclone, Super Atom, and Rogers models listed in the table.

A low stroke-bore ratio is usually employed in two-cycle engines, including model engines, and for that matter, in most modern four-cycle aviation engines.

The stroke-bore ratios of the model engines listed range from .63 to 1.21.

When viewed from the point of "What can be accomplished with a given piston displacement?" it will be found that the advantage of a low stroke-bore ratio tends to make possible a lighter engine. It can be shown mathematically that for a given volume a cylinder of equal diameter and length will have the minimum surface area. Therefore a metal cylinder with these dimensions will have a minimum weight. In actual practice, of course, an engine cylinder is never of equal diameter and length because it must be long enough to guide the piston at the bottom of the stroke and to provide a compression space at the top. Therefore an engine cylinder with less stroke than bore may be lighter than one with a stroke-bore ratio of unity because the overall diameter and length are nearer to equal. Many constructional and design considerations affect weight, however, and these generalized statements merely reflect tendencies. Since the crank throw of a short-stroke engine is less than that of a long-stroke engine, the crankcase can be made smaller in diameter, which is favorable to weight reduction.

For two-cycle engines there are two additional advantages in the use of a low stroke-bore ratio. The force necessary to overcome the inertia of the piston is one of the chief causes of engine vibration, especially in the single-cylinder type of engine so extensively used for models. This means that the piston weight should be kept low. The piston of the two-cycle engine must be long enough to cover the intake and exhaust ports when it is at the top of the stroke. If the stroke is increased, the length of the piston must be

increased, and even though there is a decrease in piston diameter (for a given piston displacement) it is difficult to keep the inertia forces low in very long-stroke engines. This is especially true because at equal r.p.m. and, therefore, essentially equal power output, the long-stroke engine will be operating at a higher piston speed than the short-stroke engine and the piston actually should be made lighter to keep the inertia forces as low as in the short-stroke type.

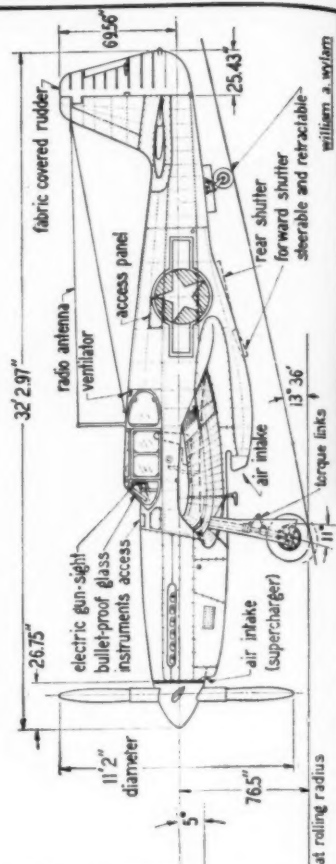
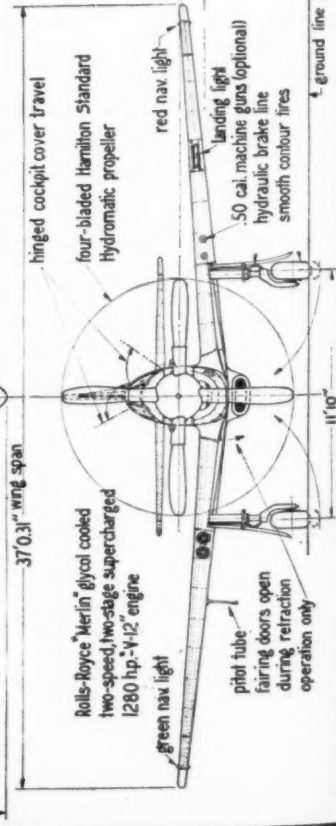
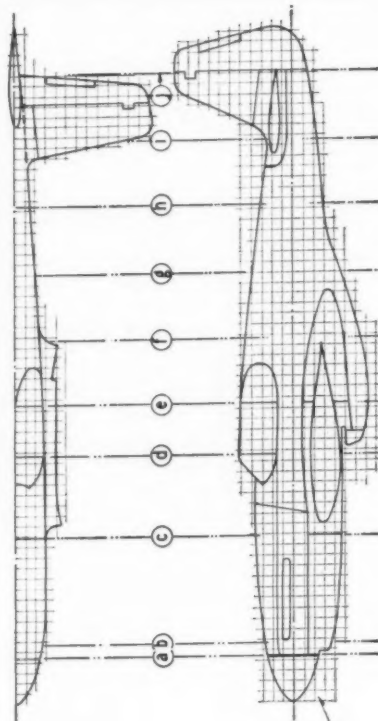
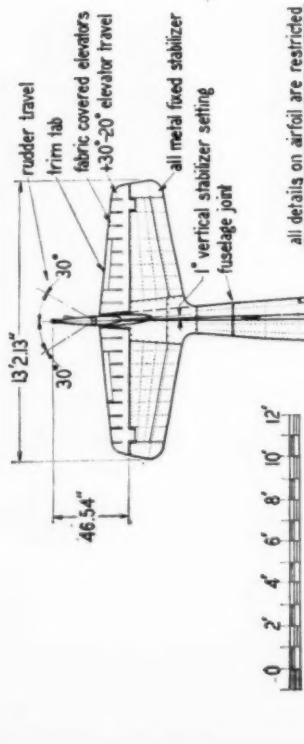
The second advantage of a low stroke-bore ratio for two-cycle engines has to do with the compression pressure in the crankcase which causes the charge to be forced into the cylinder when the inlet port opens near the bottom of the stroke. Just as the portion of the cylinder volume in excess of the piston displacement determines the cylinder compression pressure, so the amount of the crankcase volume in excess of the piston displacement determines the crankcase compression pressure. With a short stroke the crankcase can be made more compact with a consequent increase in crankcase compression.

At this point it may be well to correct the quite common misconception that a high stroke-bore ratio increases the expansion of the charge. In the early days of the automobile, salesmen used to discourage to the glib public on the advantages obtained with the then popular long-stroke engine because of the greater expansion of the charge. Actually, in conventional internal combustion engines, expansion is not a function of the stroke-bore ratio. If a comparison is made on the basis of a fixed piston displacement and different stroke-bore ratios, it is obvious that with a given cylinder compression the initial to final volume of the charge cannot differ. If, on the other hand, the bore is considered fixed and the stroke increased, the cylinder will take in a larger charge during the intake

(Turn to page 44)

NORTH AMERICAN MUSTANG P-51B

WORLD'S FINEST PURSUIT PLANE



william a. wylam

The MUSTANG



Plane on the cover

"...the highest ceiling (40,000 feet) and the highest speed (well over 400 mph) of any fighter in existence."

—OFFICE OF WAR INFORMATION

"In the single-seat fighter class, the *Mustang* reigns supreme."

—PETER G. MASEFIELD

ANNOUNCEMENT was made from London on January 11 that a new type long-range escort fighter, believed capable of flights to Berlin and return, had accompanied American heavy bombers far into Germany.

The fighter was the latest version of the North American P-51B *Mustang*, equipped with Packard-built Rolls-Royce Merlin engine with a special supercharger.

Disclosure that the *Mustang* fighters adapted for high-altitude combat may already be flying from England to Berlin and return was revealed by the United States Army Air Forces following heavy raids on Germany.

Although exact performance figures of the new *Mustang* are military secrets, the Office of War Information recently reported that it has the "highest speed (well over 400 miles per hour) and the highest ceiling (up to 40,000 feet) of any fighter in existence."

The Packard-built Merlin engine now used in the *Mustang* utilizes a two-speed, two-stage supercharger, and drives a constant speed, four-blade Hamilton Standard propeller. This power plant and propeller equipment enable the *Mustang* to accompany American bombers and protect them effectively at tremendous heights.

Packard's new motor has two small multi-bladed rotors, or stages, to provide greater compression of the thin air which prevails at higher altitudes. The thin air is compressed by the supercharger into a properly compact volume required for admixture with gasoline to form an explosive motor fuel when the airplane is in flight miles above earth.

This job is performed satisfactorily by a single-stage supercharger up to a certain altitude, but to increase the compression of the increasingly thinner air as the *Mustang* continues to climb, the rotor would have to revolve at a rate so fast

that it would fly apart.

In the new two-stage supercharger this problem is solved by the first rotor compressing the air in a manner comparable to a single-stage supercharger. Then the air immediately is passed to the second rotor to be compressed still further. This results in the air six or seven miles in the sky being compressed to six times the surrounding atmospheric pressure.

As fighters, previous versions of the *Mustang* have been operating effectively with the British Army Cooperation Command in smashing at Axis land and sea transportation, protecting troops during land operations, carrying out speedy reconnaissance missions, and fighting aerial duels with the Luftwaffe's best planes.

As fighter-bombers, known as A-36 *Mustangs*, and nicknamed "Invaders" by the men who fly them, the airplanes were unveiled by the U. S. Army Air Forces

with explosive surprise against the Germans and Italians in Sicily and Italy.

Success of the North American-built *Mustangs* with Rolls-Royce engines in initial tests resulted in orders by the War Department for increased production of this high-altitude fighter for the United States Army Air Forces at the company's plants in California and Texas.

Superiority of the *Mustang* is not an accident. In this fighter is concentrated the combined aeronautical knowledge of the U. S. Army Air Forces, the Royal Air Force and North American Aviation, Inc.

All the information on modern warfare gathered by Allied observers during many months of aerial combat was available to engineers at the North American plant in Inglewood, California, when, in April, 1940, the British began working with the company on plans for production of a fighter plane.

The British Purchasing Commission first requested that North American produce a type of fighter already in production. Primarily because the officials of North American did not believe that particular type adaptable to the company's simplified quantity production methods, President J. H. "Dutch" Kindelberger informed the Commission that his company would prefer to design and build a totally new type, incorporating all the lessons learned in the first six months of war.

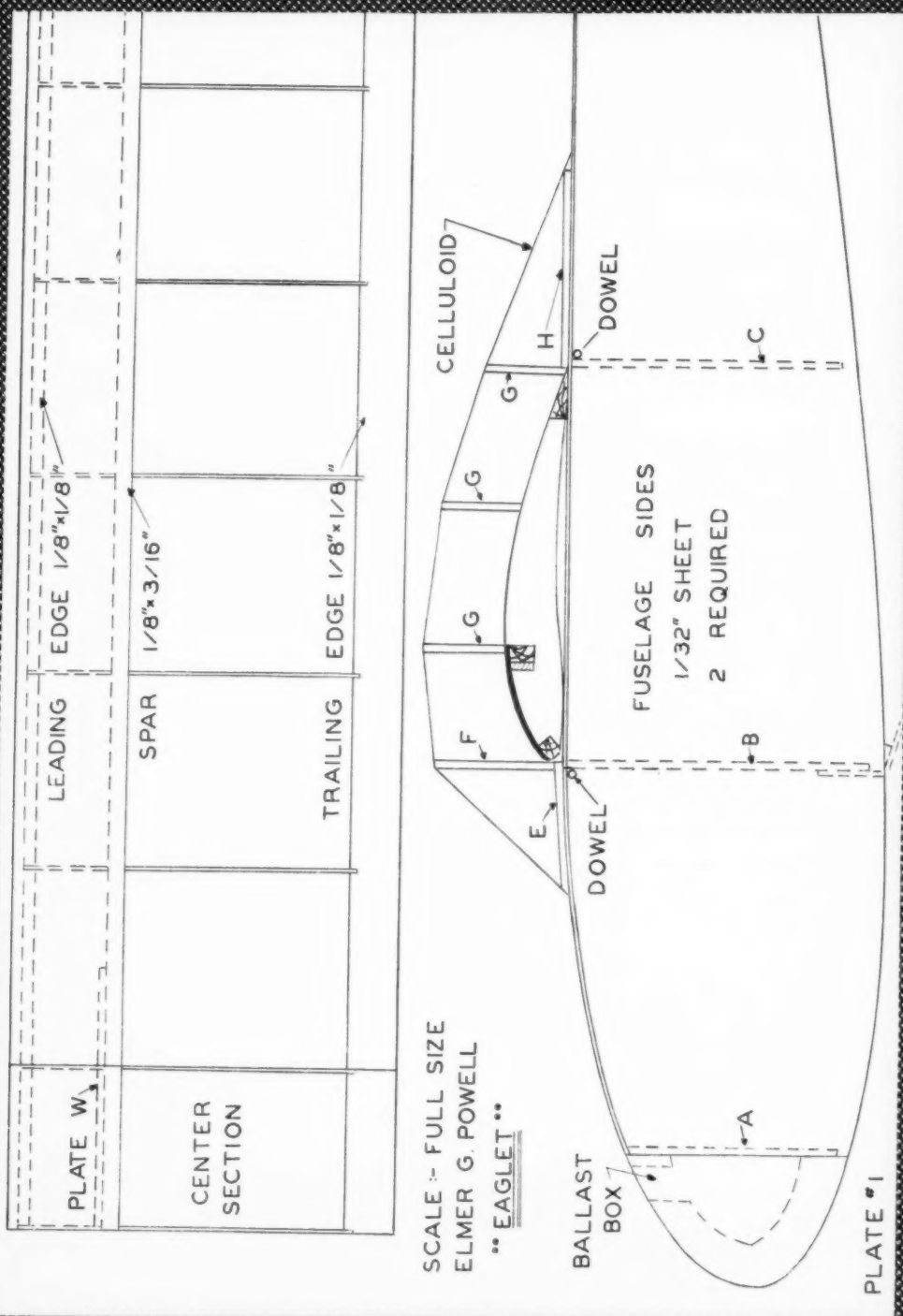
After extensive preliminary discussions, the British Purchasing Commission gave the firm a list of requirements which the new fighter must meet, and a 120-day schedule to complete the design and the prototype airplane.

In all, more than 2800 original drawings were made in designing the *Mustang*. Working from skeleton specifications prepared from sketches and verbal instructions, engineers made up their plans, checked with each other, made correc-

(Continued on page 48)



North American Test Pilot Bob Chilton enters *Mustang* P-51B preparatory to test flight



SCALE - FULL SIZE
ELMER G. POWELL
** EAGLET **

Graceful lines and simple construction insure the success of this high performance soarer



The **EAGLET**

by **ELMER G. POWELL**

HERE is a simple but proven sailplane. Have no fear if you are short of balsa; several models of this design using balsa wood, pine, and a combination of both were built and all had excellent flight characteristics. Come on now, build this tow line glider and you will be rewarded with many fine flights.

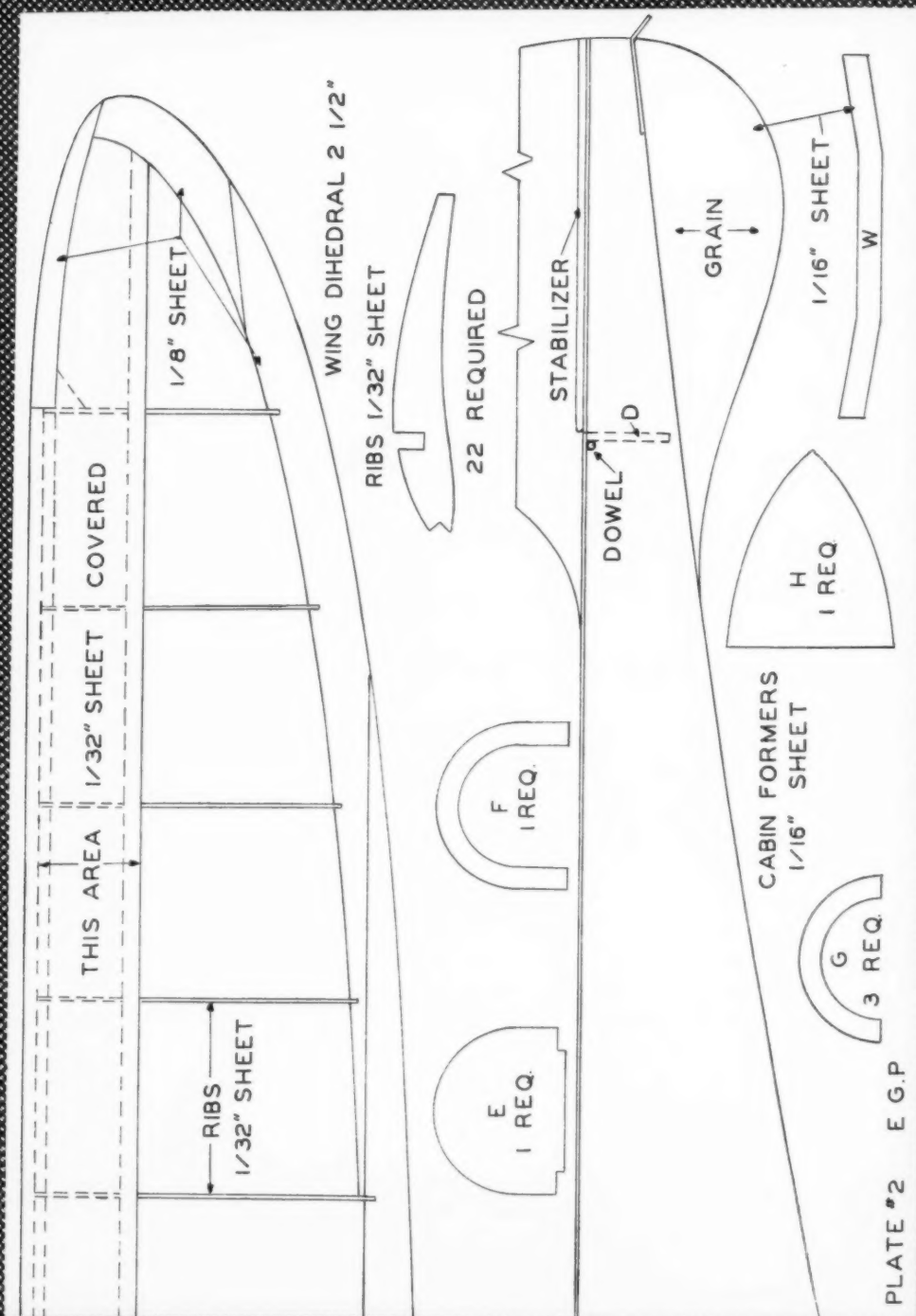
The fuselage is constructed from 1/32" sheet. The top, marked x-x on the plan, is cut to shape and formers B, C and D are cemented at right angles to it. After the formers have completely dried, attach the fuselage sides and add former A. Attach the stabilizer support. Cover the front and top with 1/32" sheet. Now add the combination nose block and ballast box plus the 1/16" diameter dowel and the hooks. Sand the completed fuselage and cover with tissue.

The wing and cabin may be next. The wing ribs are cut from 1/32" sheet while the trailing

edge is made from 1/8" stock. Note that all ribs are inserted slightly into the trailing edge. A dihedral of 2-1/2" is built into each wing tip before the area between the leading edge and the spar is covered with 1/32" sheet planking. Cover the entire wing with tissue and then add the cabin detail as shown on the plan. The cabin is covered with a light grade of celluloid.

The tail surfaces are cut from their respective sheeting as shown in the plan. Attach the fin to the stabilizer and cover the assembly with colored tissue.

Adjust the model for a long, smooth glide by adding small weights to the ballast box. Heavy thread is used for the tow line. The "Eaglet" should be towed into the wind and released at its highest altitude. This sailplane will lead you on many a merry chase so I suggest not wearing your best pair of shoes.



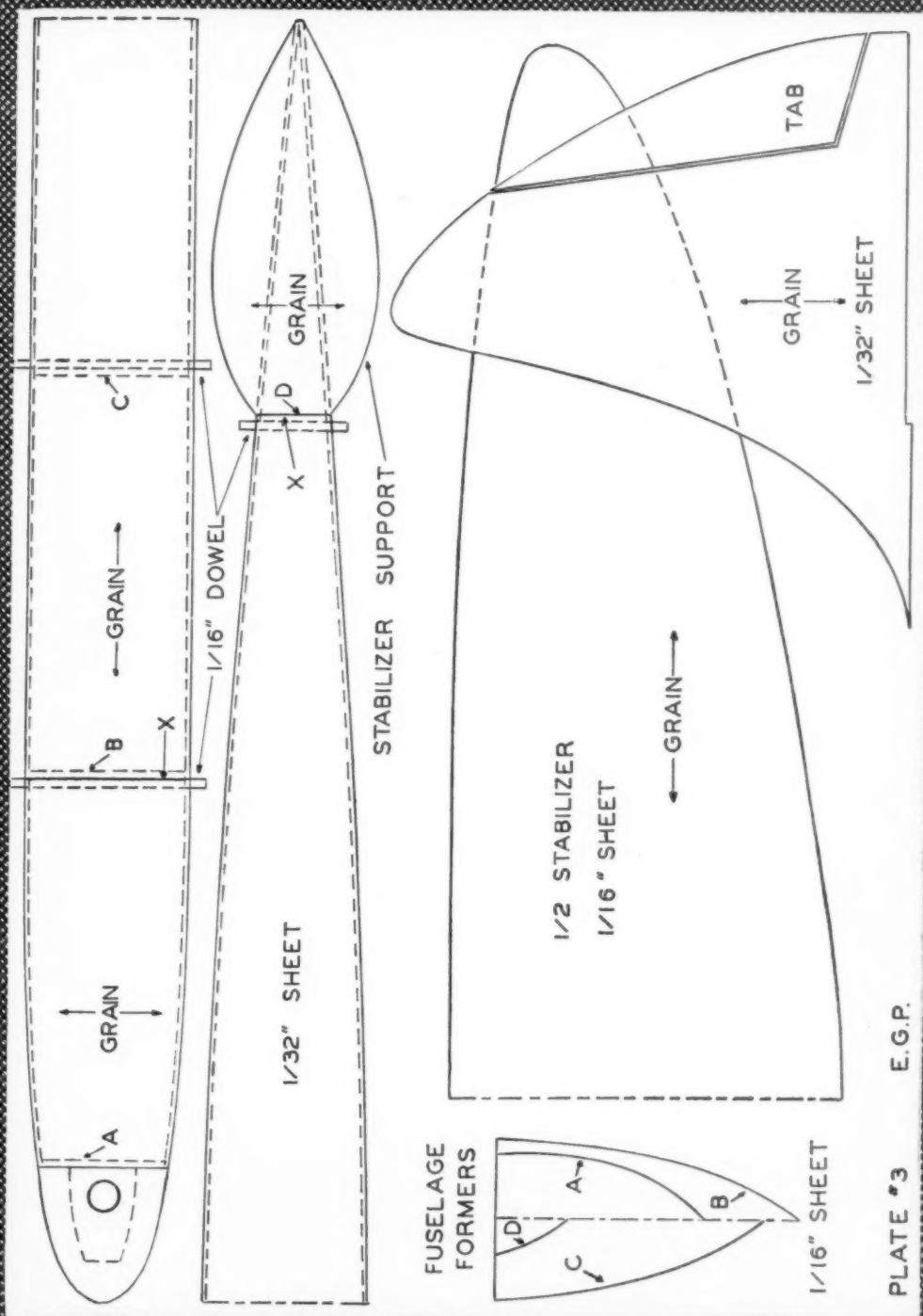


PLATE #3 E.G.P.

WORLD WAR I ALBUM

A Collection of Photographs and Technical Data



S. E.-5a

Wolseley *Viper*.....200 hp
Span26 ft. 7½ in.
Length20 ft. 11 in.
Height9 ft. 6 in.
Gross Weight.....1,750 lbs.
Ceiling20,000 ft.
Max. Speed.....132 mph

Considered by many the outstanding fighter of the war, the S.E.-5a was designed by Mr. H. P. Folland, of the Royal Aircraft Factory, and went into service with No. 56 Squadron in April, 1917. Flown by such men as Major Edward Mannock (73 victories, top British ace), Captain James McCudden (58) and Captain Albert Ball (43), it handled beautifully and had a tremendous rate-of-climb. Standard S.E.-5 used direct-drive engines. The S.E.-5a, with exception of *Viper* version, had high shaft.



SOPWITH CAMEL F.1

Clerget130 hp
Span28 ft. 0 in.
Length18 ft. 9 in.
Height8 ft. 6 in.
Gross Weight.....1,524 lbs.
Ceiling19,000 ft.
Max. Speed.....124 mph

One of the most maneuverable of fighters, the *Camel* was liked and disliked to equal degree by its pilots. *Camels* shot down 1,294 enemy planes, a record equalled only by the modern *Hurricane*, its lineal descendant. Used by both the Royal Flying Corps and the Royal Naval Air Service, various other models were powered by Le Rhone, Bentley and Monosoupape engines. At the Armistice, there were 2,582 *Camels* in service. Rotary engine gave *Camel* vicious torque and bad reputation.



SOPWITH DOLPHIN
5 F.1

Hispano-Suiza300 hp
Span32 ft. 6 in.
Length22 ft. 3 in.
Height8 ft. 6 in.
Gross Weight.....1,959 lbs.
Ceiling21,000 ft.
Max. Speed.....128 mph

A development of the *Camel*, the *Dolphin* was larger and heavier and featured improved armament with some models being fitted with two additional movable guns on the upper wing center section. Negative wing stagger was used to improve the pilot's visibility and the *Dolphin* was dangerous to an enemy plane above it. No. 19 Squadron received *Dolphins* in January, 1918, the first to use it.

SASEBO "O"

"PETE"

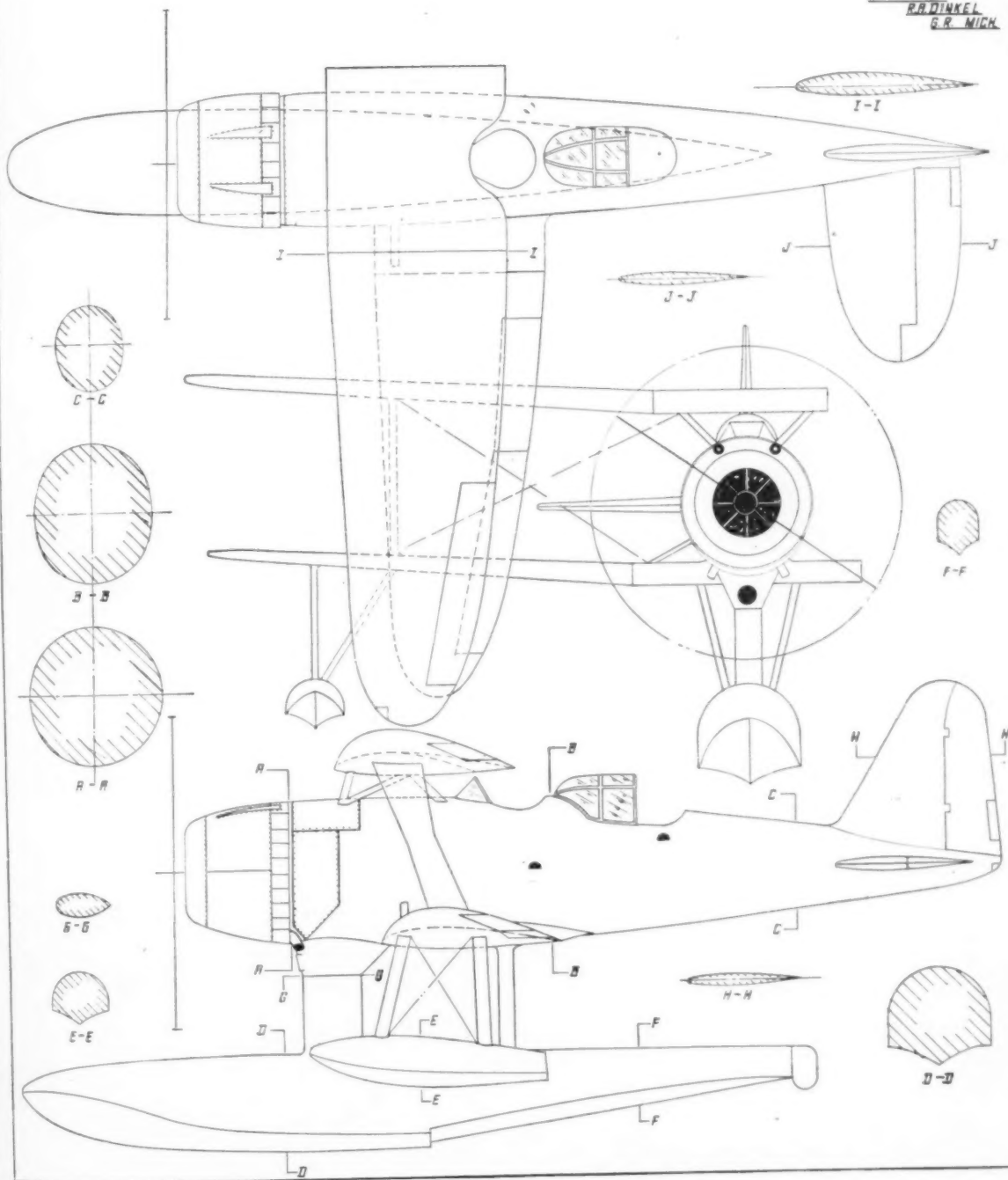
RECONNAISSANCE

DATA

SPAN-----37'
 LENGTH-----34' 6"
 HEIGHT-----14'
 SPEED-----138 M.P.H.
 SERVICE CEILING-23,000'
 ARMAMENT-----3- 77 MM. MG.
 BOMB LOAD-----500 LB.

INSIGNIA
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Lockheed Lightning P-38

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Boeing Flying Fortress B-17

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*Focke-Wulf Fw-190

*Mitsubishi Zero KI-001

Spitfire

Vought Kingfisher OS2U

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How Good Is the Enemy?

((Continued from page 7))

a German ship up there. Watch how good our planes are beside it."

Despite reports which have reached the public about American planes being inferior to Jap planes, and German craft having superior armament, flying rings around our ships in combat, the hard cold fact is—and this is based on actual reports not "armchair opinions"—that American fighting planes today fly higher, faster, farther, pack more firepower, are tougher and better built than any enemy plane that has been tested here.

But, by the same reasoning and common-sense thinking, engineers claim there is no truth in reports that the enemy is using inferior metals, poor construction or few instruments—their planes are good, they do what they are supposed to do, and sometimes do it better than was generally accepted.

Engineers here have the utmost respect for Nazi design and developments, construction and performance. They have found German aircraft well-built, of good material and fine workmanship—the product of carefully laid plans and ingenious ideas. In one case they found that the Germans were using a liberal amount of magnesium and high grade aluminum in building their planes. The construction of the Junkers Ju-88, twin-engined high-altitude bomber, revealed that approximately 600 pounds of magnesium castings were used—a quantity not common in U. S. built aircraft.

Test pilots who flew the Me-109 F made these comments, as taken from their actual flight reports: "Easy to fly with good stall characteristics . . . Handles well in the air . . . Lands smoothly, with slower landing speeds than most American planes . . . The location of the propeller control on the throttle is more desirable than is our own mechanism."

"This airplane would probably be at its best against fighters," one pilot said, "but not so good against bombers due to insufficient armor protection and lack of firepower."

Another test pilot remarked: "It does everything that a good fighter plane should do and a little more."

A veteran pilot who flew one of the Me's over Springfield, Ohio, one day had the engine quit in a climb and he had to bail out of the fast little, tricky ship with his parachute. He commented: "The easiest damn thing to get out of I ever saw."

That was the report on the first Messerschmitt sent to Wright Field in the summer of 1941. Another model arrived in 1942 after the battle of Stalingrad. Captured by the Russians, and tested thoroughly by Soviet pilots, the ship was sent to the field knocked-down but with engine intact in the fuselage. Engineers took one look at it, remarked about the oddity of the big red star painted over familiar German Swastikas on the wings, and told mechanics to "paint it white" (U.S. insignia then) and to take the engine out for tests by the Powerplant Laboratory. Six mechanics who had never seen a Messerschmitt before went to work on the engine mounts and tried to figure it out. Less than a half hour later the crew chief called the lab chief and said: "We're done—the engine's out!" "What?" said the surprised officer, "How'd you do it?"

He soon learned. The job took only 22

minutes—far less time than it would have taken to remove the engine from any one of our own fighter ships with which mechanics were familiar. Study revealed that the Germans had centralized their engine mounting so that all the engine lines and control cables ran into a small number of main sockets—plugged in much the same as you push the wall plug into its socket to light the floor lamp, and just as simple too. When certain plugs were pulled out, the engine fell loose in its chains and could be moved away. This has, in some cases, resulted in simplification of engine installation in our planes.

In dismantling the engine, mechanics found that the Germans had printed instructions in fine type on the various parts of the machine to aid in making repairs. This is part of the Nazi plan to use unskilled labor for servicing aircraft. With these instructions plumbers and electricians can easily make repairs and perform minor mechanical jobs.

Right now there is a later version of the Messerschmitt at the field, a ship captured in Tunisia. It may hold the clue to some new Nazi development. But it is not so much the planes themselves that are under observation (complete planes are hard to get), as it is the small parts of enemy planes which are picked up here and there from shot-down enemy aircraft and eventually find their way here.

Over in the Powerplant Laboratory, Colonel Gillespi, a genial snappy Army officer who knew the Germans when he was attache in Argentina, has a lot of Japanese, German and Italian engines which he doesn't hesitate to tell you "aren't worth a damn" compared to ours.

There is one unique engine, a B.M.W.-801 which has its own cooling fan. Used in the new Focke-Wulf Fw-190 and in other types, it develops 1,600 horsepower, comparable to our in-line engines that go into the Lightnings, Airacobras, Kittyhawks and Mustangs. On the forward end it has a big blower fan that looks like an ordinary electric fan and revolves about 2½ times the propeller speed, blowing cooling air through the cylinders and thus providing more efficient cooling on the ground, during climb and at high altitudes when the air is thin and less dense.

An unusual engine is the Junkers Jumo diesel with opposed pistons that are arranged in-line. Very narrow vertically, engineers have contemplated that it might be used inside wing sections, laying horizontal and completely streamlined. This particular engine was used on large German transports which were shot down by the hundreds when they tried to rush supplies to Rommel's fleeing columns across the Mediterranean. They do not develop much horsepower and are not rated highly by U.S. engineers who haven't yet turned out anything in the way of diesel power for planes. Use of the engines by the Germans also indicated desperate need for fuel—since diesels operate on oil, gasoline being so scarce. These engines, six of them, were installed on big German gliders which were called transports. They were slow, bulky and easy prey for U.S. and allied fighters.

One engine that is highly praised is the Jumo 207 which came from a German

(Turn to page 36)

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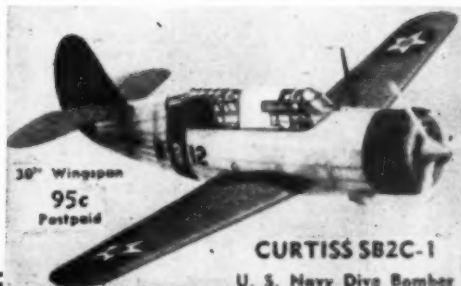
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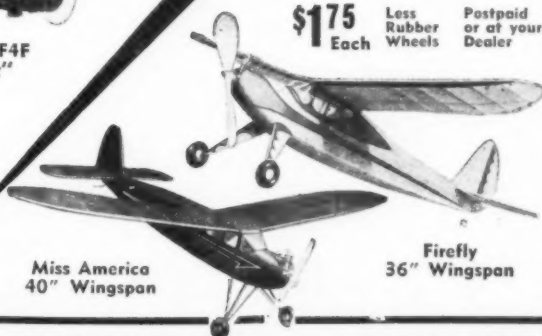
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plane capable of extraordinary high altitude performance. The British shot down one of the ships at 43,000 feet with a Spitfire.

Other pertinent data gathered from captured German auxiliary equipment has revealed:

Nazi flyers in Africa carried with them in their airplanes large aluminum containers for water which were virtually thermos bottles to keep the liquid at a cool drinkable temperature despite the desert heat. The Germans, supposedly short on metals, were using pure aluminum of the highest quality for this auxiliary piece of equipment. It is not done in our own emergency kits; this is an interesting fact because we are the world's largest producers of the precious white metal.

Another interesting piece taken from a German fighter is the Mauser Mg-51 20mm. cannon which will shoot from 800 to 900 rounds per minute, faster than most guns of the same power that are going into our own aircraft. The piece is accredited as being one of the outstanding firearms used on aircraft in this war. Already we have taken steps to kill its effectiveness, getting thicker armor plate that will stop its bullets.

German bombsights taken from a Junkers have proved accurate. By comparison they have been acclaimed equal to some of our own, but not up to par with our automatic sights that no longer aim at the pickle barrel and hit it from 10,000 feet, but now can accurately pick out "their particular pickle." Details of the German bombsights show that the lenses going into the sight mechanisms are unexcelled anywhere.

Regarding Jap equipment the story is different:

Perhaps this will illustrate best the feeling toward the little men of Nippon. A friend of mine who is in the Foreign Evaluations branch, remarked: "The Germans show some initiative—the Japs are just copyrats."

Various Jap gadgets have been studied. There are several types of Japanese machine guns: one shoots a 7.9 mm. shell, which is a little smaller than the ordinary rifle bullet, and it is rated very poor. This was copied from a British rifle used in 1914. Fired against our quarter-inch armor plate, it hardly dented the protecting metal and had no effect on our latest armored glass.

The Japs have an effective 20 mm. cannon which was taken from a captured plane called "Oscar." Gun experts, however, hesitate to compare it with our rapid fire, high velocity .50 caliber guns of which the Thunderbolt fighter mounts eight.

Jap radio equipment isn't fit to be compared with even that of American amateurs. It lacks any range of real effectiveness. The reception in the airplane is crackling and very poor, and the set is cheaply made. By comparison with the German equipment it is much inferior since Nazi radios are on a par with our own.

One thing does favor the Japs. They have a little gadget on their latest automatic pilot which our engineers liked; it worked a bit better than a similar piece which we were using. Now it is being applied to our new types and proving very efficient. Tojo never intended that.

Very little Italian equipment has been sent here, but what has been seen indicates an interesting trend in the Italian mind with regard to design. The Italians like trim and glaring display; they

decorate their instrument panels with glaring colors—one machine gun had chromium plated handles. Since Italy has surrendered, there probably will be a new inflow of Italian machines.

Clothing worn by German and Japanese aviators is also being tested. There are such things as a Jap pilot's electrically-heated flying suit, shoes, gloves and boots; a German pilot's electrically-heated suit, boots and headgear. Much interesting data has been learned about each, but as yet no reports of their being better than our equipment have come to light.

The Jap uniform, taken from a pilot shot down over New Guinea, is made of very cheap material—both leather and lining—and its wiring system is comparatively simple although quite effective. The electrically-heated boots are sufficiently warm, but they are made of the cheapest leather obtainable and are very stiff and uncomfortable.

There was also a small suitcase taken from the pilot. Inside was a detailed diagram of the electric suit and how it worked so that the pilot could fix anything himself if a mechanism failed. Apparently it was copied from the Germans. This is being considered for adaptation.

American pilots who saw the German electrically-heated suit were jealous. It is made of the best quality material, lined with velvet and very soft and warm. It is covered with a series of zippers which make it easy to get out of. This was amazing to engineers who believed that there was a shortage of zippers in Germany. German boots also had numerous zippers which was accounted for by the fact that they were taken from a pilot who patrolled the channel, and zippers made it easy to shed the boots if he were shot down. They bore a resemblance to typical hob-nail and rubber heels taken from the British.

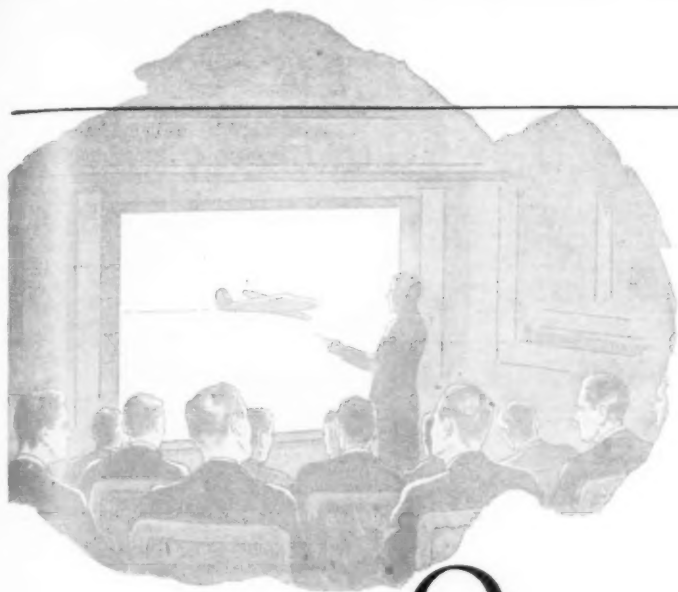
There are hundreds of other items: oxygen masks, fuel feed systems, landing gears, control columns, armor plate, instruments of all types, bombsights, compasses, fuel gauges, altimeters, brakes, shells—virtually everything the enemy is using for his aircraft is, in one form or another, under study at the Materiel Command's test laboratory.

Here is the unfolding story of the enemy at home, of his planes and the engines that propel them, of aircraft auxiliary equipment and armament—a new story of sleuthing that someday soon may help to decide the war!

VICTORY



"Diurnal lepidopterous?"



It Takes a Lot of Training to Make a Pilot!

ONE OF the wonders of this war is G. I. training . . . the tremendous amount of education and training accomplished in *hours* instead of weeks, and in weeks instead of *years*! Instead of the two to four years formerly required for a foreign language, the army produces practical conversational foreign language in a few hours. New methods are being used that teach in a few weeks the essential mathematics and physics of an entire high school or college course.

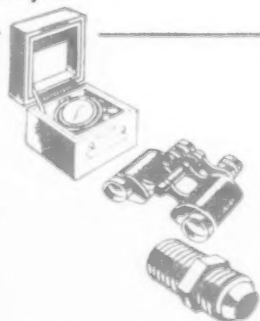
Accepting only those candidates of high physical and mental qualifications for its cadet training, the Air Force immediately equips these future officers with a liberal education, and proceeds in the same thorough and intensive manner to turn them into experienced and highly skilled pilots, navigators, bombardiers and gunners—men who are disciplined, tough, keen and resourceful. Every man who graduates into the air force is equipped to take care of himself under every conceivable circumstance.

The desire to become a flier usually comes when a lad is very young. Fascinated by airplanes, he begins by building simple little models, and as his skill grows, more complicated models and gas-powered types soon follow. In these preliminary stages, Megow Model Kits have held a dominant place for years, encouraging and promoting aviation study among boys who are now flying and building for Uncle Sam.

Today the large manufacturing facilities of this company are turned to war production, and hobbycraft lines are produced only in limited quantities. We hope our friends and customers will all approve and not feel disappointed when their favorite kits are not obtainable.

In the meantime, post-war plans are under way for the production of new Megow models that will match the tremendous changes in construction and design. New techniques and new precision methods developed in our war manufacturing will also bring great changes, and models such as never seen before. Many previous models are being discontinued, to be replaced by new ones when materials of the high quality required by Megow standards become available, and war production permits.

Most of the facilities that were formerly used in manufacturing Megow Model Kits are today producing Ship Chronometers, Binoculars, Airplane Motor Fittings and other articles of great precision and highest attainable quality.



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Flash News

(Continued from page 2)

Dr. Nicholas Murray Butler, President of Columbia University, recently stated: "Engineering and medicine are the two most important intellectual occupations and will continue to be so in the future." General Henry H. Arnold recently wired the Bell Telephone System: "Directly as a result of your special electronic equipment the Army Air Forces has been able to take the offensive against Japanese shipping at a much earlier date and under conditions which normally would have made such operations impossible." The U. S. Post Office Department collected \$60,500,000 for airmail postage stamps in 1943, paid the airlines \$22,500,000 of it for carrying the mail and pocketed the difference of \$38,000,000 or just 62% profit. Air-mail now eight cents! Executive F. Lee Talman of TWA forecasts: "In any future war the United States will have no more than a few weeks to prepare for total war. Any nation failing to maintain aerial defenses may perish before those defenses are created."

Domestic airlines have given up 1 in 8 of their radio range stations and these are now guiding our military craft over oceans, deserts, mountains and icefields. These instruments, with frequencies measured in kilocycles, will be obsolete by the end of the war. The development of very high frequencies means stations with clearer signals in all kinds of weather with former short range far extended.

The Ninth Air Force, Major General Lewis H. Brereton commanding, is to spearhead the invasion of Europe, according to a recent announcement. Its task will be fourfold: blast the enemy fighters out of the sky, systematically destroy railroads, marshaling yards and communications, hammer selected ground targets impeding the infantry advance and its troop carrier forces will drop paratroopers and glider troops behind enemy strong points in localized areas. Happy landings to the honored Ninth! Airborne rocket-shells with wings were launched by Marine torpedo planes for the first time at Rabaul. Twelve Nip ships got the new treatment. Pilots say these winged missiles leave the plane with a terrific explosion but no jolt.

American bomber losses over the continent were cut from 3.1% to 2.2%: in 1942 a total of 31 were lost, 972 in 1943 and 335 so far this year. Increase in number and decrease in percentage gives an idea how, numerically, operating air divisions (450 to 750 planes) have increased. Compared to our 1943 loss of 972 is the R.A.F.'s loss of 2,369 bombers. The production version of the Martin Mars is known as the JRM-1 and can carry 132 soldiers or 84 wounded with 25 attendants. As a cargo carrier its four 2,200 hp Wright double-row radial engines will lift seven jeeps plus a greater number of guns or engines. The JRM-1 is the first of twenty now under construction. The Mars recently delivered 800,000 letters from Pacific soldiers to U. S. After cancellation of their contract for three giant flying boats made of wood, Kaiser-Hughes announced plans to build the same plane from metal and asked WPB to continue the contract. Other builders intervened, however, with the objection that such a move would mean government competition. Built of metal, the Kaiser-Hughes monster would be finished just in time to be available for post-war

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world air routes, and nicely built with government money.

Aircraft disposal by private capital is beginning to rear its ugly head with the application of innumerable combines purporting to have pooled enough money to buy every warplane the government may desire to sell. These, of course, would be distributed and re-sold to the public at a "small" profit. Bugaboo of the last post-war years, aircraft disposal again becomes a problem. Department of Commerce is keeping names secret but fantastic amounts of capital (cold, hard cash) is said to be available from some of the groups.

Russia reportedly favors a post-war air route between Moscow and Chicago, shortest air-line route between the two nations. Such post-war plans indicate a bleak future for major population and industrial centers swollen by good harbor traffic. Inland cities are optimistic about a very fast shift of financial and trade centers inland to good airport facilities, rather than the centuries-old monopolies of good seaports.

Brigadier General Albert J. Browning, Director of Purchases for the Army Service Forces recently stated that the cost of a Consolidated B-24 Liberator has been reduced from \$238,000 each, two years ago, to \$137,000 each at present. In a similar vein, it required 200,000 man-hours to build a four-motored bomber at the start of the war. It now requires only 13,000 man-hours, a saving of more than 90%. Machine-tools, assembly break-down, mass production ingenuity of the American engineer have made it possible.

Vice-Admiral John H. Towers, one of the Navy's first aviators and former Chief of the Bureau of Aeronautics, has been appointed Deputy Commander in Chief, Pacific Ocean Areas, the Navy Department has announced. Strong recognition of the role of airpower in the Navy has at last come. After "stepping down" from the Buero post, Towers was lost in the general administrative fog for the past year as director of aviation training in the Pacific (whatever that is). He now serves as second in command to Admiral Chester W. Nimitz, Commander in Chief of the Pacific (biggest and most powerful of U. S. Navy) Fleet, and a strong advocate of strong airpower used intelligently comes into a position of high authority in the attack on Japan.

The Vought Corsair F4U-1 has long been widely publicized as a "carrier fighter" but stories now circulating intimate that it was too "hot" for carrier operation and hasn't, as a matter of fact, ever seen carrier service. It is used widely by the Marines as a land-based fighter and large numbers of them are now in use by the British for a similar purpose. It has proved valuable as "island hoppers" in the Pacific and on several occasions has been the first type to land on and operate from newly won bases. The Marines are now using the Curtiss Helldiver in the Pacific. Although the Marines have always used Navy planes, the new dive-bombers are known as A-25's, the AAF designation.

All widely published stories of Russian pilots' preference for American planes to the contrary notwithstanding, Major Vasily Matsievitch, of the Russian Air Force, states that Soviet pilots prefer their own Yak fighters to those of either the U. S. or Britain. Their second choice of the Bell Aircobra testifies to their preference for "low down" airplanes, types (like the Yak) that are at their best at low alti-

(Turn page)

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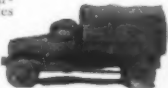
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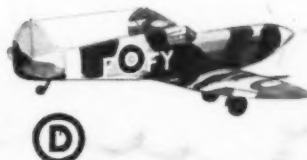
—that's the tune America's Model Builders are singing these days!

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tudes. The Russian Air Force is designed primarily for ground cooperation duties. American fighters are designed for high altitude work.

The Air Transport Association, after a lengthy study in cooperation with Douglas Aircraft, has announced that it will require about \$10,000 to re-convert a Douglas C-47 into a passenger air-liner, between \$40-\$50,000 to re-convert a Douglas C-54A (four-motored). Lists of parts required have been prepared (re-conversion consists principally of adding items to the bare frame of the Army version) and should these parts be ready immediately upon the armistice, the first new airliners will be ready in about one month. If the parts have to be obtained wholly after the war, about six months will elapse before the airlines receive any substantial equipment.

The Civil Aeronautics Board has received an application for 41,633 miles of routes to be flown by 10,000,000 cubic feet dirigibles (half-again the 6,500,000 cu. ft. capacity of the giant Akron and Macon). The firm, known as U. N. Airships, Inc., plans to carry mail, passengers and express over routes including Moscow, Calcutta, Capetown, Brisbane and Chungking. There are a total of 98 applications for new air routes on file with the CAB awaiting approval. Prior to approving a new route, the Board must satisfy itself that the firm has the equipment, knowledge and experience necessary to safely carry out the intended operations.

Two noted World War I aces are in the news this month. Captain A. Roy Brown, formerly of the Royal Naval Air Service, who leapt into world fame on April 21st, 1918 by shooting down Rittmeister Manfred Freiherr von Richthofen, died on March 9th, 1944 on his farm Lisnaclin near Stouffville, Ontario, Canada at the age of 50. After completing his courses at Wright Brothers Flying School, Dayton, Ohio, he was sent to France in 1915. In poor health for the greater part of his life, Brown offered his services to the British Naval Air Arm in this war but was turned down. Of the famous trio, Brown, Barker and Bishop, only Air Marshal Billy Bishop, chief of Canadian pilot training, remains. Col. Barker having been killed in a plane crash in England many years ago. Captain Brown was awarded the Distinguished Service Order and the Distinguished Flying Cross and Bar for his downing of the famed German ace, who claimed 80 victories at the time of his death. Air Commodore Raymond Collishaw, another Canadian fighter of World War I has retired from the Royal Air Force after twenty-eight years of unbroken service. Officially credited with 68 victories while flying and fighting in Belgium, France, Russia, Turkey, Egypt and half-a-dozen native uprisings in British possessions, Collishaw has received the D.S.O., O.B.E., D.S.C., D.F.C. and is a Commander of the Bath. Upon retirement he received the rank of Air Vice-Marshal. His favorite fighting plane was the Sopwith Triplane, which he painted solid black.

A new type German transport or powered glider has been reported by a "rocket-coast" pilot who dove on what he thought was a Heinkel bomber. As he neared the craft, peering into his gun-sight, it suddenly looked like TWO Heinkels tied together with an additional engine at the joining point. His gun camera revealed it as a giant transport with two large fuselages and five engines.

(Turn to page 44)

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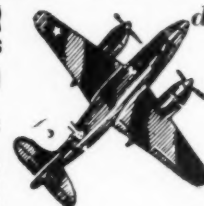
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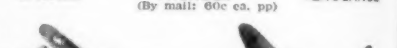
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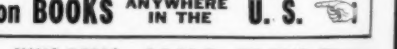
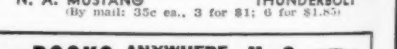
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DAUNTLESS AVENGER
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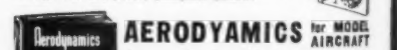
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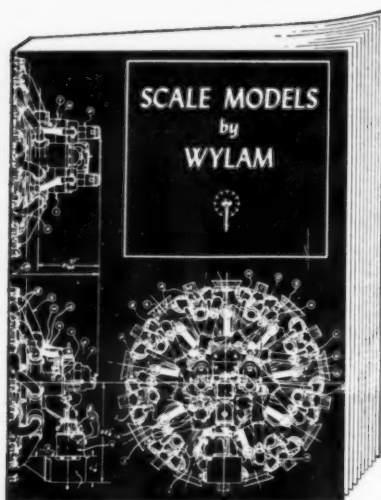
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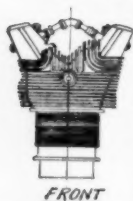
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Model Airplane News - May, 1944



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A German newspaper carried news of a giant Russian transport plane larger than anything built to date. Although no details are given the report states that the monster carries assault guns, tanks and fully laden trucks and could cover a Junkers transport plane under a single wing panel.

Recent announcements by the Royal Air Force that the Napier Sabre 24-cylinder engine (used in the Hawker Typhoon) develops 2,200 horsepower contradicts their earlier claim that it developed 2,400 hp. It is thus no longer the most powerful aircraft engine in service, two American radial engines developing similar powers are in service and have been for some time. The standard "horsepower" rating may have to be revised when applied to jaypees. The term BHP, indicating Brake Horsepower, is normally determined through the use of a torque meter or "brake." Jaypee engineers will have to figure out something new.

Don't let stories of "a plane in every garage" after the war throw you. According to a survey, Northwestern National Life Insurance Company reports that only 2½% of the families of America plan to buy an airplane after the war.

The Irish Air Force, now mobilizing in the event of war with England and the United States, contains several German Heinkel planes! Among its equipment are Spitfires, Hurricanes, Martlets and Hudsons. Guess how this smörgåsbord air force was acquired: internment of planes landing on Irish soil! The Government of Eire assures us, however, that full and just payments have been made for these planes to all the governments affected.

News of a Messerschmitt Me-310 has come via Rome Radio, who claim it to be the counterpart of the British Mosquito, a light, twin-engined hit-and-run machine of extremely high speed. Last month we reported the new Focke-Wulf Fw-290 as being fitted with a Daimler-Benz 2,000 hp. engine. Latest news indicates a BMW 18-cylinder air-cooled radial engine of 2,100 hp is used and that the newer version resembles the very familiar Fw-190 in every detail.

More news on the Higgins helicopter experiments. A series is to be built ranging from two to fourteen-seaters. The first of the series (two-place, side-by-side) has been completed. It has a sin-

gle four-bladed main rotor and a small, vertical rotor at the tail. Fully enclosed, the fuselage sweeps rearward and upward to a point, like a dragonfly. Cooling ducts are located in the main rotor support.

All training plane production has been curtailed by the Army Air Forces and Consolidated-Vultee, Aeronca and Fairchild facilities are now being used for sub-assembly work on large bombers. Boeing's Wichita Division (Stearman) was completely converted to bomber production many months ago. About 50,000 training planes have been produced in this country, most of which will be "for sale" within a few months.

A new type airplane propeller has been developed, although the manufacturer remains unnamed. The core is of metal but the remainder is of hard rubber into which gas bubbles are blown, making the interior look like sponge. A hard shell of rubber and neoprene is placed on the foundation and the entire assembly is lacquered and polished. We understand the Japanese, who own the world's primary rubber sources, are now hard at work developing synthetic rubber. Reason: shipping losses have deprived the homeland of the quantity of natural rubber needed for the war effort.

General Motors has developed an "all-purpose" motor claimed to be suitable for installation in automobiles, trucks and airplanes. A four cylinder two-cycle Diesel, it develops 160 hp and officials believe that it will have a wide post-war market.

The entire 15th Air Force has been transferred from North Africa to the Italian mainland, it has been revealed. A number of Supermarine Spitfires bearing U. S. markings are in use by pilots of the 15th. Boeing Aircraft has announced plans for a post-war airliner capable of carrying 100 passengers. An official of the firm recently stated that the company would turn to "other things" after the war.

The height of overstatement came recently when an official Japanese broadcast, monitored in San Francisco, reported as follows: "Eight enemy bombers accompanied by two fighters were intercepted by our aerial patrols. All twelve of the enemy were shot down!"

VICTORY

Model Airplane Engine Performance and Design

(Continued from page 23)

period and expansion will be no greater, assuming, of course, the same compression ratio is maintained. Increasing the stroke with the bore fixed merely increases the displacement, that is, makes a bigger engine. The displacement can also be increased by fixing the stroke and increasing the bore.

It must be remembered that low weight is not the only consideration in the design of miniature engines. Other considerations are reliability, the ability to withstand hard knocks in service, and cost of manufacture.

The majority of model engines produced have been of the single-cylinder type. The simplicity of the single-cylinder two-cycle engine is favorable to low manufacturing cost and repair expense, and undoubtedly this type of engine will continue to be popular long after the war. The weakness of the single-cylinder type is that the inertia of the reciprocating parts causes the engine to vibrate, that

is, to shake up and down. This vibration can be partly overcome by crankshaft counterbalance weights.

In the two-cylinder-in-line two-cycle engine this tendency to vibrate up and down is greatly reduced but not eliminated. There is also some rocking vibration in the plane of the cylinder center lines. Since there are twice as many power impulses per revolution as in the single-cylinder engine, the torque or turning effort is smoother. Torque reaction is the cause of another form of engine vibration and it decreases with an increase in the number of power impulses per revolution.

The two-cylinder opposed two-cycle engine is pretty well balanced mechanically. There is only a rocking vibration in the plane of the cylinder center lines which is caused by the fact that the cylinders are not directly opposite each other. To obtain this good mechanical balance

(Turn to page 46)

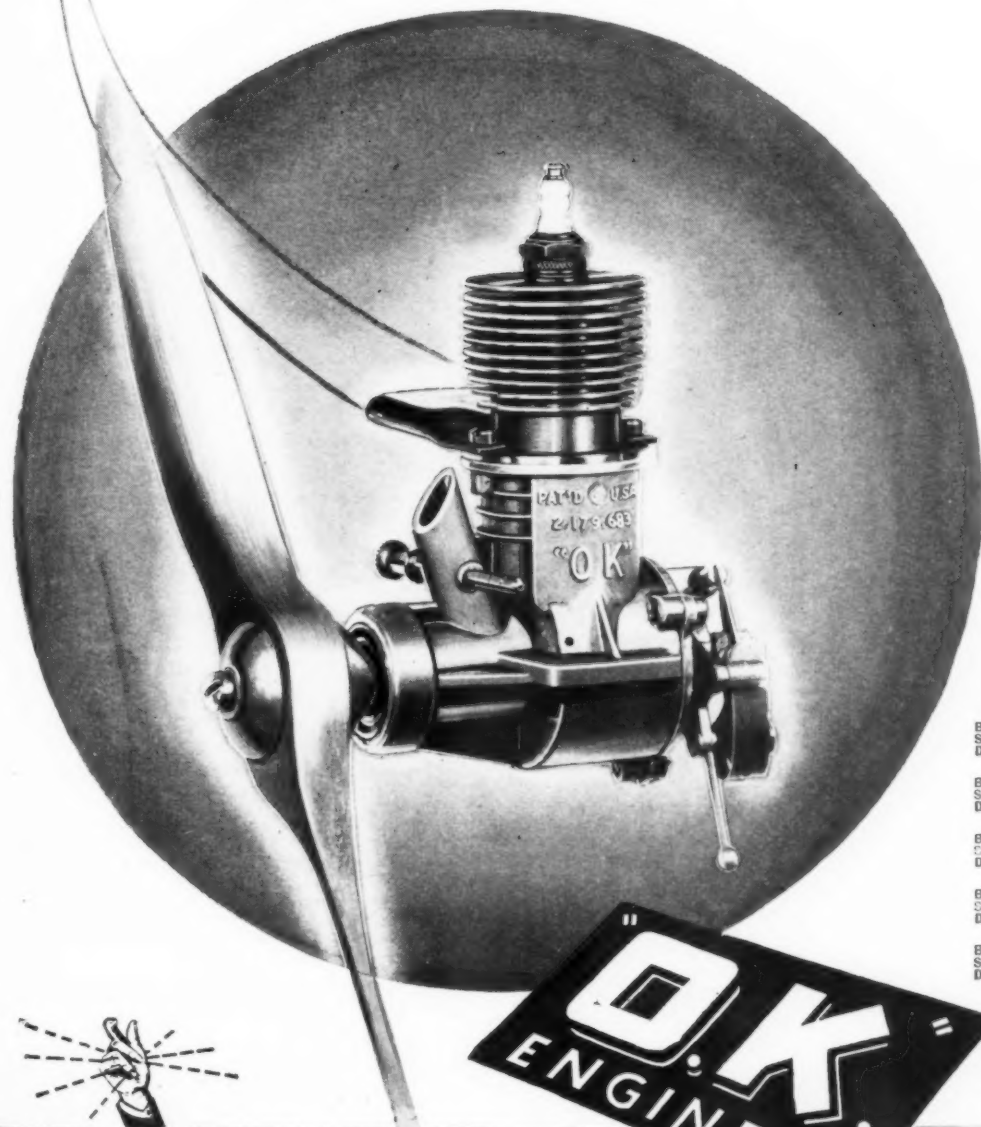
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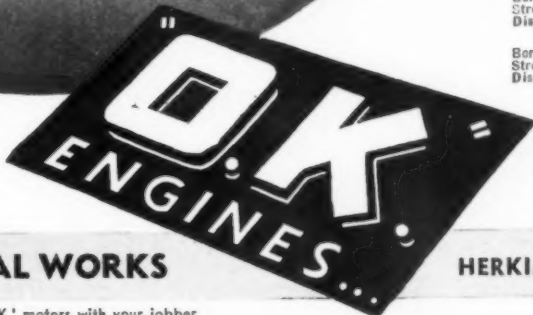
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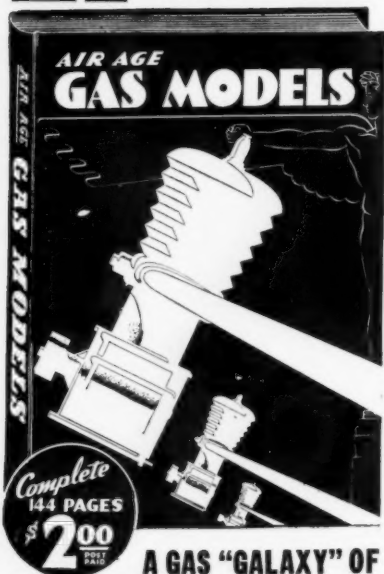


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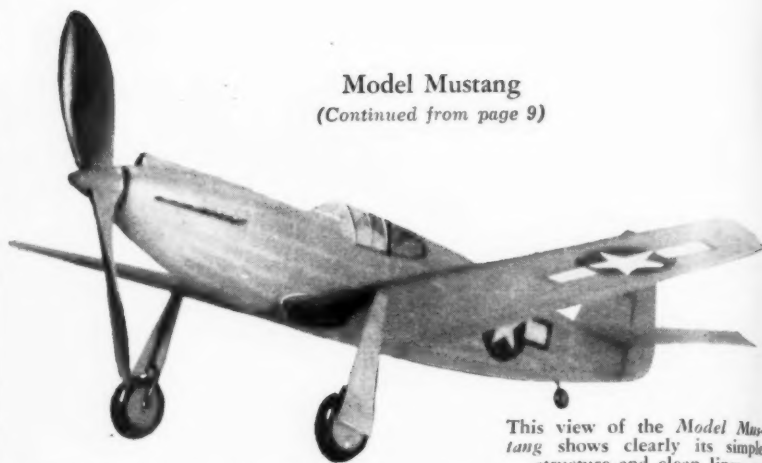
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Model Mustang
 (Continued from page 9)

This view of the Model Mustang shows clearly its simple structure and clean lines.

doped to the celluloid. Finish the landing gear next; rubber or cloth insulating tubing slipped from electric cords, etc., is used to cover the wire landing gear legs. Wheels should be painted before they are held to the axles by drops of solder. The cover that closes the recess once the landing gear is retracted on the real plane is represented; it is made from 1/32" sheet. Attach it in such a manner that the strut is free to spring and thus absorb shock. If a radiator is used it should be attached now. Details such as exhausts, air scoop, tail wheel, etc., are made from scraps and they go a long way to enhance the appearance



of the model. Naturally all exposed wood parts should be painted.

FLYING—Depending on the finished weight of the model, 10-12 strands of 1/8" flat rubber will be needed for power. Before placing the motor within the fuselage, lubricate it. The rubber strands are held in the rear by a bamboo dowel. The plane is now ready for its test flight.

Careful testing is required to get the maximum performance from any model. Roughly adjust the center of gravity of the little ship first by adding weight to the nose or tail to bring it into balance when held at the wing spar. Then make any further weight adjustment by gliding from shoulder-height. If it stalls, add weight to the nose. If it dives, remove weight or add a bit to the tail.

First power flights should be made with just a few turns, and as the performance improves and confidence is gained, increase the power. Tilting the thrust line down will eliminate a tendency to stall under power, while right or left thrust will control the amount of circle. Once flights are satisfactory, use a mechanical winder to store up maximum power. The original model flew best when it was adjusted for a large left circle under power and a sweeping curve to the right in the glide.

VICTORY

Model Airplane Engine Performance and Design

(Continued from page 44)

and also to use one crankcase for charging both cylinders it is necessary for the crank throws of the opposed engine to be arranged so that both pistons reach the top of their respective strokes at the same time. The cylinder charges must be ignited simultaneously resulting in one power impulse per revolution as in the single-cylinder two-cycle engine.

In the four-cylinder opposed two-cycle engine the vibration caused by the inertia of the reciprocating parts is eliminated and there are two impulses per revolution as in the two-cylinder in-line engine. Except for the increased complication this is a very desirable type for model airplanes since it has excellent mechanical balance and is fairly compact in design.

In comparison with large cylinders, the cylinders of miniature engines have a much greater surface area in relation to their piston displacement, so that heat losses are necessarily greater. This would indicate that a relatively higher compression ratio could be used and, in fact would be necessary for maximum efficiency. An examination of the figures on

the compression ratios employed in miniature engines reveals that they are not as high as would be expected. The Class A Super Atom with a very small cylinder has a compression ratio of 5 to 1. A ratio of 8 to 1 is used on Forster models. This is not very much higher than the ratios used on large four-cycle aircraft engines having cylinder bores around 6 in. The Scott two-cycle light plane engine already mentioned has a compression ratio of 6.8 to 1.

Forster Brothers state there is no doubt that higher compression ratios can be used in miniature engines with proper attention to combustion chamber design and cooling, and say that they intend to carry the compression ratio to the reasonable limit in postwar models.

Despite the fact that small cylinders should be easier to cool, considerable difficulty has been experienced with overheating and consequent cylinder warp in miniature engines. This warp may cause leakage between the transfer and exhaust ports. To prevent this, Herkimer in his O.K. models constructs the cylinder with

(Turn to page 48)

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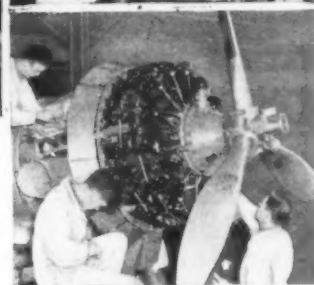
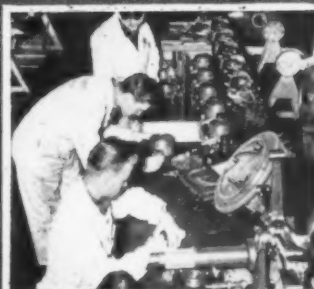
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In spite of their 120-day deadline, North American's engineers dared to make innovations, and the best known of these innovations was the now famous "laminar flow" wing (laminar flow meaning parallel or undisturbed flow of layers of air). This type of airfoil never had been used before, but extensive research into laminar flow theory had been performed by the National Advisory Committee for Aeronautics.

The new airfoil, the exact details of which still are highly confidential, had several distinctive features. The greatest thickness, in cross section of the wing, was moved well back and was followed by a teardrop-shaped trailing edge. The new contours gave an effective distribution over 40 per cent of the chord as against 20 per cent in older designs, permitting the air to build up desired pressures over double the usual area, reducing shock waves, and increasing speed.

Next to the low-drag airfoil section used on the *Mustang*, perhaps the greatest factor in the plane's aerodynamic perfection is the fuselage, which reportedly possesses the smallest cross-sectional area ever to be placed behind a liquid-cooled engine.

In determining the actual external lines of the *Mustang*, lofting department engineers made the first application of a mathematical second degree curve technique to aircraft design, and perfected a method of determining mathematically the best streamlining possible between two given points.

It is impossible to describe all the features of the *Mustang*, or to tell the full story of its development, principally because certain information is still restricted for reasons of military security.

In the last analysis, the *Mustang* (or any other leading military plane) is great not because any one man or group of men had a superior inspiration, but because many little jobs were done a little better than they had been done before—done by men who had gained experience over a long period of years, and who had learned to work with their colleagues in a smooth-functioning organization—and because the sum of these little jobs done better constituted an end product superior in degree to other products.

Specifications

TYPE—Single seat fighter monoplane.

WINGS—The airfoil section is an N. A. A. modified N. A. C. A. laminar flow, low drag type. The wings consist of two panels bolted together at the center plane of the fuselage. Full cantilever skin stressed construction is used. The main and rear spars are of flanged aluminum alloy sheet construction. The flap and aileron hinge supports are mounted on the rear spar. The remaining structure consists of extruded stringers and pressed ribs. The skin covering is aluminum coated aluminum alloy. Space between the main and rear spars on each side of the centerline is arranged to hold the fuel cells. A structural door is provided in the under-surface of each wing section to facilitate fuel cell installation and removal. The ailerons are of the sealed balance type.

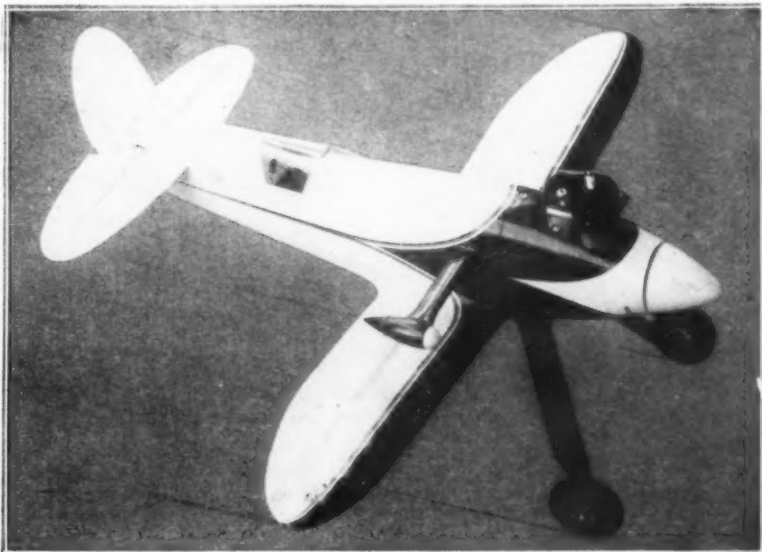
FUSELAGE—The fuselage construction at the cockpit section consists of two curved side panels. The structure consists of four longerons, two on each side of the cockpit, forming the structure of the side panels together with the outer skin, which is reinforced by vertical frames. Aft of the cockpit, the longerons extend

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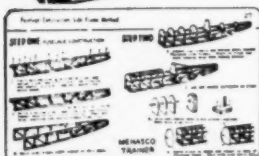
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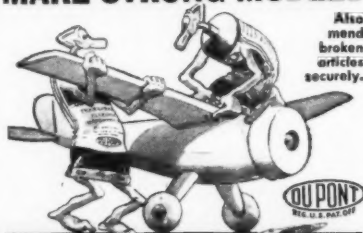
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into a semi-monocoque structure reinforced by vertical frames. All skin and frames are aluminum coated aluminum alloy. The fuselage is divided into three sections: the engine section, the main section, and the tail section. All sections are detachable, and attached with bolts. A combination engine coolant and after-cooler radiator is located at the bottom of the fuselage aft of the cockpit, and an oil temperature regulator is located forward of and beneath the engine coolant-aftercooler radiator in a separate duct; both units are enclosed in a duct with automatically controlled, adjustable outlet air scoops.

TAIL UNIT—The tail unit is a full-cantilever structure with a semi-monocoque fin and stabilizer. The horizontal stabilizer is constructed as one unit with detachable tips. The full-antilever metal-covered structure consists of two spars, aluminum alloy ribs, and extruded stringers. The elevators consist of two sections, each interchangeable with the other. The elevators are of fabric covered aluminum alloy construction. The structure consists of a front spar, a short intercoastal rear spar, flanged ribs, and metal leading and trailing edge sections. Both elevators are statically balanced and equipped with trim tabs controllable from the cockpit for longitudinal trimming of the airplane under all flight conditions. The vertical stabilizer is a full-cantilever semi-monocoque structure consisting of a forward and rear spar, flanged ribs, and extruded stringers.

The rudder is similar in structure to the elevator and is fabric covered and dynamically balanced. It is equipped with a trim tab controllable from the cockpit for directional trimming of the airplane under all flight conditions.

UNDERCARRIAGE — The alighting gear consists of two main landing gear assemblies and a steerable tail wheel. All three units are extended and retracted by hydraulic pressure. They are completely enclosed by fairing doors when retracted. The tail wheel is capable of swiveling 360° and is steerable within the range of the rudder pedal travel. The wheels of the main landing gear units are fitted with hydraulic brakes.

POWER PLANT—The airplane is equipped with one Packard-built Rolls-Royce Merlin liquid cooled, two-stage, two-speed supercharged engine. The engine is equipped with a ramming type air intake for altitude operation. A Hamilton Standard hydromatic four-blade propeller with a 11' 2" diameter is provided.

ACCOMMODATIONS—The cockpit is under a flush type transparent canopy with an upper and right side section hinged to open for ingress and egress of the pilot. A sliding window is incorporated in both side sections. The complete enclosure, as a unit, may be quickly jettisoned for emergency egress of the pilot.

DIMENSIONS—Span, 37' 5/16"; length, 32' 3-1/4"; height, 8' 8"; total wing area, 233.19 sq. ft.

PERFORMANCE—Ceiling, 40,000+ ft. Speed: 400+ mph.

(We are indebted to North American Aviation, Inc. for the above information.—EDITOR.)

VICTORY

WARPLANES!

page
38

THE MOST HIGHLY DEVELOPED AND FINEST DETAILED MODELS IN THE WORLD

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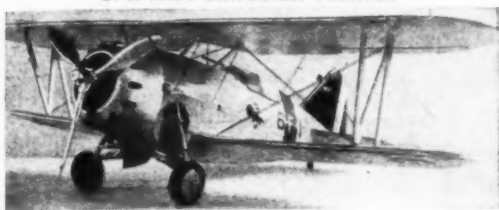
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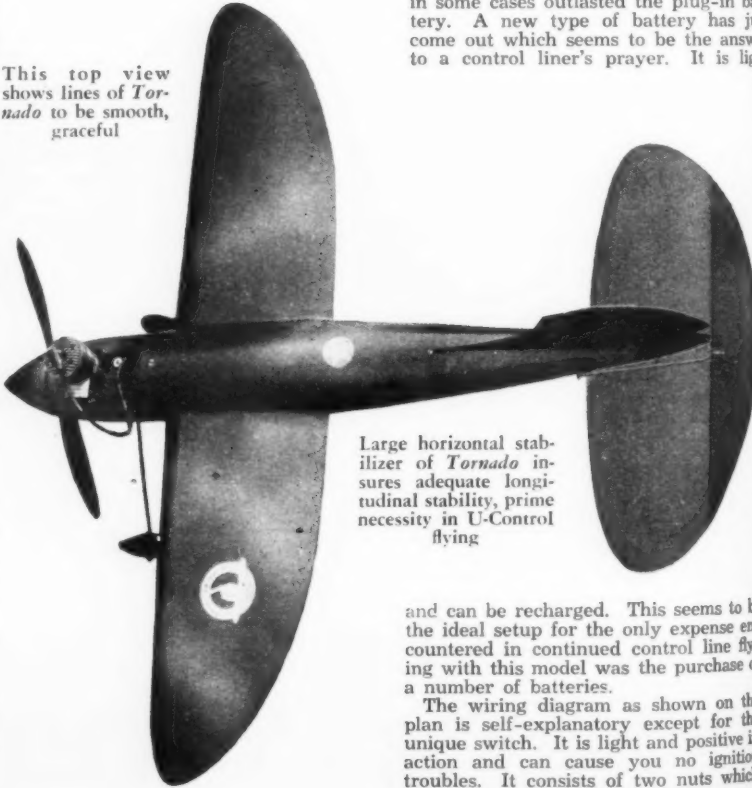
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This top view shows lines of *Tornado* to be smooth, graceful



Large horizontal stabilizer insures adequate longitudinal stability, prime necessity in U-Control flying

and can be recharged. This seems to be the ideal setup for the only expense encountered in continued control line flying with this model was the purchase of a number of batteries.

The wiring diagram as shown on the plan is self-explanatory except for the unique switch. It is light and positive in action and can cause you no ignition troubles. It consists of two nuts which

Tethered Tornado

(Continued from page 17)

height of the mounts to bring the thrust line into the right position. This is important if the spinner is to run true in relation with the fuselage. The motor is held to the mounts by four machine screws and the mounts in turn are screwed down to the front of the ship by four small wood screws. A small amount of side thrust against the circle of flight may be incorporated to keep the ship tight on the lines.

CONTROLS—The control plate controls is made from 1/16" fiber or aluminum to the dimensions on the plan. It is mounted in the fuselage 2 1/2" behind the leading edge of the wing. A small wood screw and a few washers—one above and one below the plate—is all the hardware needed. The elevator control horn is made the same as the control plate. It is mounted on the elevator 1/2" from the center line of the fuselage.

The control rod is bent up of 1/16" wire. A wire coat hanger is excellent material for this as it can be easily formed to any shape desired. The dimensions of the rod on the plan may not fit into your ship perfectly so don't bend the wire to shape until you are ready to install it in the ship.

WIRING—Mount the coil in the top half of the fuselage above the wing. Wires are run from each end of the coil to the leading edge of the wing where they are soldered to a pair of jacks. This enables the top half of the fuselage to be removed without disturbing the wiring. The batteries are placed immediately behind the control plate. They can be either two pen cells or the regular three volt ignition battery that comes with the plugs and jacks. Although the plug-in type battery is quite convenient, two pen cells proved to be just as efficient and in some cases outlasted the plug-in battery. A new type of battery has just come out which seems to be the answer to a control liner's prayer. It is light

are placed in small holes cut in the lower half of the shell. A section of the wooden fuselage which passes between the nuts acts as an insulator and the only time that current can pass through the circuit is when the bolt is turned in enough to contact both nuts.

The bolt is kept screwed out until it is desired to switch on the batteries. If boosters are desired for starting, the positive lead may be clipped on the bolt protruding from the switch and the negative on any part of the engine itself (cylinder head, crankcase, etc.)

FUSELAGE ASSEMBLY—To hold the fuselage halves together, bore two small holes in the top half of the shell to accommodate two long bolts. One hole is bored just before the leading edge of the wing and the other just in front of the rudder. Put a mark on the lower half of the fuselage where the bolts touch. Gouge out a small square to take the nuts and put them in place. A few bent pins and plenty of glue keeps the nuts from loosening due to vibrations. Note that a small block may be needed to raise the rear nut to the proper level (see fuselage plan).

SPINNER—The spinner is next on the program; it is quite easy to make if you start off on the right foot. Screw a long wood screw into the center of the 2 1/2" face of a 2 1/2" x 2 1/2" x 3" basswood block. Leave about 3/4" of the screw protruding from the block and cut off the screw head. Roughly carve the spinner to shape. Insert the protruding end of the screw into a drill chuck and start turning. A little "treatment" with coarse and fine sandpaper while turning will bring the spinner to a neat and smooth finish. (This is a quick trick for making spinners and small cowls for any model.) Hollow out the spinner to a wall thickness of 1/4" leaving it a little heavy in the nose where it has to take a beating on rough landings.

WING AND TAIL—The wing is one of the quickest and strongest we have ever constructed. A 7/8" x 1/2" basswood leading edge and three pieces of 1/2" x 13/4" balsa are glued edge to edge. When the glue is dry trace half the wing pattern, reverse and trace the other half and cut out the wings with a coping saw. Roughly shape the airfoil with a plane or spoke-shave and then get out the good old sandpaper block and go to work. A little extra energy and time spent in sanding will be well repaid by a smooth, slick wing. Groove the center of the wing with a knife and crack in 1 1/2" dihedral under each wing tip. Push plenty of glue into the groove and the joint will be as strong as the rest of the wing.

When cutting the holes in the top half of the fuselage that accommodate the wing, remember to make them big enough to allow the leading edge to be raised 1/4". This gives the wing about 21/2 degrees incidence. Glue the wing into the top half of the fuselage with plenty of glue, and while it is drying start to work on the tail.

The stabilizer and elevator are made of 1/8" sheet basswood. A number of hinges are made from scraps of thin cloth and glued in place as shown on the plans. Mount the stabilizer on the lower half of the fuselage with hinge line just at the back edge of the body.

The rudder is made exactly like the horizontal tail and is mounted on the ship slightly off center to keep the plane tight on the lines. A small metal clip cut from



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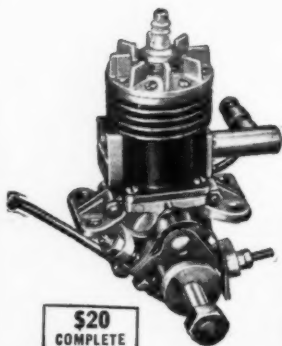


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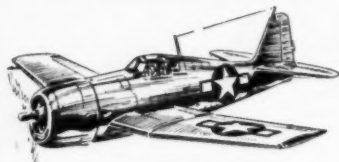
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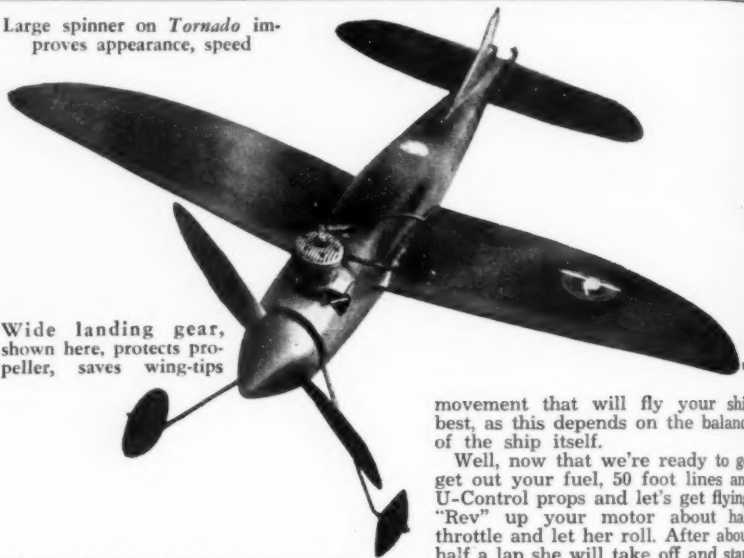
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VICTORY

a tin can, shaped as shown on the rudder plan, is used to keep the rudder setting tight.

FINISHING—After the wing and tail are cemented in place the entire ship is given the once over with fine sandpaper and then covered with rubber model tissue. This supplies fillets at all junctions and is a quick and light method for getting a smooth finish. A few coats of colored dope with all the trimmings finishes the job. The original ship was doped a deep Indian Brown with "camouflage" of yellow sprayed on. The spraying was done with an ordinary "flit" gun, the only adjustment necessary being extra thin dope. A few snappy decals will add zip to the ship.

FLYING—This plane is flown in a counter-clockwise direction, therefore the rudder should be turned toward the outside of the circle. When test-flying the rudder should be turned considerably. Although this slows down the ship it guarantees control at all times. After a few flights the rudder may be returned toward neutral slowly until the best control is obtained. Another precaution to take when flying is to insert a few pins in the control plate platform to limit the movement of the tail. Experiment alone will determine the range of longitudinal



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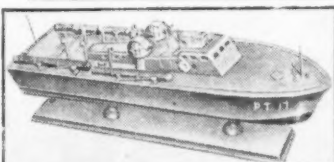
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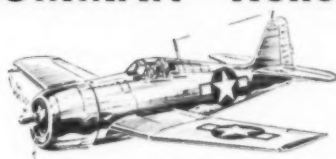
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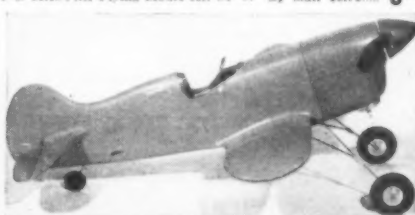
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Air Ways

(Continued from page 15)

type section cuts down center of pressure travel to a minimum. With increased longitudinal stability comes higher stalling angles (lower stalling speed) and, therefore, increased soaring ability. In general practice, this type section has a detrimental effect on high speed due to its comparatively high drag coefficient. However, this is more than offset by an increased lift coefficient. Perhaps if Leonard measured a test flight a little more closely he would find that his model actually flew slower than with the conventional cambered airfoil. It is through just such experiments, however, that the science of model building is made valuable. And we admire Leonard for his enterprise.

William E. Lovelace, 906 South Humphrey, Oak Park, Illinois, is responsible for the Consolidated Catalina PBV shown in Picture No. 4. We would like to tell you that he built this model from the excellent PBV plans appearing in our April, 1944 issue . . . but we can't! Bill says "This model took me a little over two weeks to build. It was made from a 15c kit but was covered with sheet balsa and the wing floats were made retractable. Landing lights are also fitted." We

might point out the pure white background Bill used in making the photograph.

Models should be photographed against either a pure white or a solid black background for best results. When taking a picture of your model, use a sheet or a blanket of any solid color. So many pictures of excellent models come in to us through the mail that are rendered valueless by sidewalks, heavy weeds, houses, pets and automobiles in the background. Only those without such impedimenta can be used.

Nelson D. Wight, Jr., 619 Robbins Avenue, Philadelphia, Pa., writes in to tell us all about Pictures No. 5 and 6. No. 5 shows his Messerschmitt Me-109F, which required about 200 hours to build and is complete in every detail: movable controls, fire extinguisher, safety belt and all required armament. The fuselage is built up and the landing gear retracts completely.

Of Picture No. 6 Nelson says: "The Grumman Wildcat model is my 'pride and joy' and required 250 hours to build. All details are included: controls, instrument panel minutely detailed with glass

covers over each dial and indicator, radio and earphones, seat and safety belt. The shiny finish was obtained by covering the ship with aluminum foil. There are 3500 rivets pressed in with a blunt pin. The model also has a 14-cylinder Pratt & Whitney engine that required about 35 hours to build."

When we first saw Picture No. 7 of the Vought Corsair F4U we were curious as to why a large plane photograph should be addressed to AIR WAYS. But its builder, Lee Herscher of 1205 South 5th Ave., Kankakee, Illinois, assures us that it is only a perfectly reproduced control line model built to a scale of one inch to a foot. Lee says: "The wing, built in one piece as a removable unit, is covered with 1/16" sheet balsa and is keyed in place and held by bands from inside the fuselage. The control plate is inside the wing. This method of mounting makes the ship almost indestructible and is ideal for control line work. The fuselage is covered with 1/8" x 1/4" planking. The cowl is removable by sliding it forward when prop and keys are removed. The batteries and switch are reached through the sliding hatch. The antenna is removable. Powered by an Ohlsson '60' it weighs 3 lbs. 4 ounces." Lee has made many successful flights and his Corsair is "plenty fast."

We are always most particularly interested in models built from plans appearing in MODEL AIRPLANE NEWS for in this manner alone are we able to be sure we are rendering a service to our readers. We are very pleased, then, to publish Picture No. 8 of the Curtiss P-40 built by Leslie E. Inman of Oakland, California. This beautiful model was built from plans published recently and Les has done an outstanding solid scale construction job. Let's hear from you some more.

Picture No. 9 is only a model, believe it or not, Stinson *Reliant*, the work of E. J. Kress, ACMM, U.S.N., Navy 311, Box 18, F.P.O., San Francisco, California. E. J. says that the Stinson is rigged for control-line flying but that "the South Pacific area doesn't offer too good flying conditions for model planes." Kress also sent in a photograph of "Stinky" which is like nothing we've ever seen (shown in Picture No. 11). He says: "Stinky was



No. 11 This is Stinky. You figure it out!

our idea of the New Year Lad's rip shorter for general transportation. The main piece of material in its construction is one slightly used oil drum. Local ingenuity did the rest." Well, we can't make heads nor tails out of "Stinky" but here it is for you to figure out for yourselves.

Picture No. 10 comes from Albert Putzer, 1218 5th Street, Oshkosh, Wisconsin, and shows his Grumman *Wildcat* solid scale model with built up structure

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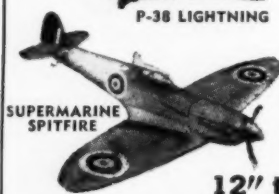
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of balsa throughout. A complete model Pratt & Whitney double-row radial engine is in the nose. Albert has also built that old favorite, the Curtiss Hawk P-6E and we hope to publish pictures of it soon.

NEWS OF MODELERS

Janet Smith, Box 216, State Center, Iowa, says: "I would be interested in writing to model builders. I would also like to trade plans of airplanes for military insignia, buttons, etc. I will send a list of my plans to anyone who may care to write." There's your chance, fellas, give the gal a break.

S/Sgt. Irving T. Jacobs, 27th Evacuation Hospital, c/o Postmaster, Elkins, West Virginia, is anxious to contact a model club in his vicinity. He says: "Being a member of the armed forces, my model building activities have been rather cramped for the past twenty months. It is not easy to continue with such a hobby in an Army camp. At present we have been able to secure some free time and are anxious to contact a model club in our present vicinity." Irving and his pals would like to hear from any of you club members near Elkins, West Virginia. Drop him a line at the above address.

CLUB NEWS

Illinois

The *Sky Wolves* of Des Plaines, Ill., wish to announce they are planning two U-Control model airplane meets for the coming season. These meets will be big affairs with plenty of prizes.

The first contest will be held May 21st at Rand Park, Des Plaines, Illinois. This meet will be under the joint sponsorship of the *Sky Wolves* and the Chicago Daily Times and will be known as the "Des Plaines Valley U-Control Championship Meet." The second contest will be held on the same site July 23rd. Interested modelers may obtain further information from C. J. Hein, 115 North Dunton Avenue, Arlington Heights, Illinois.

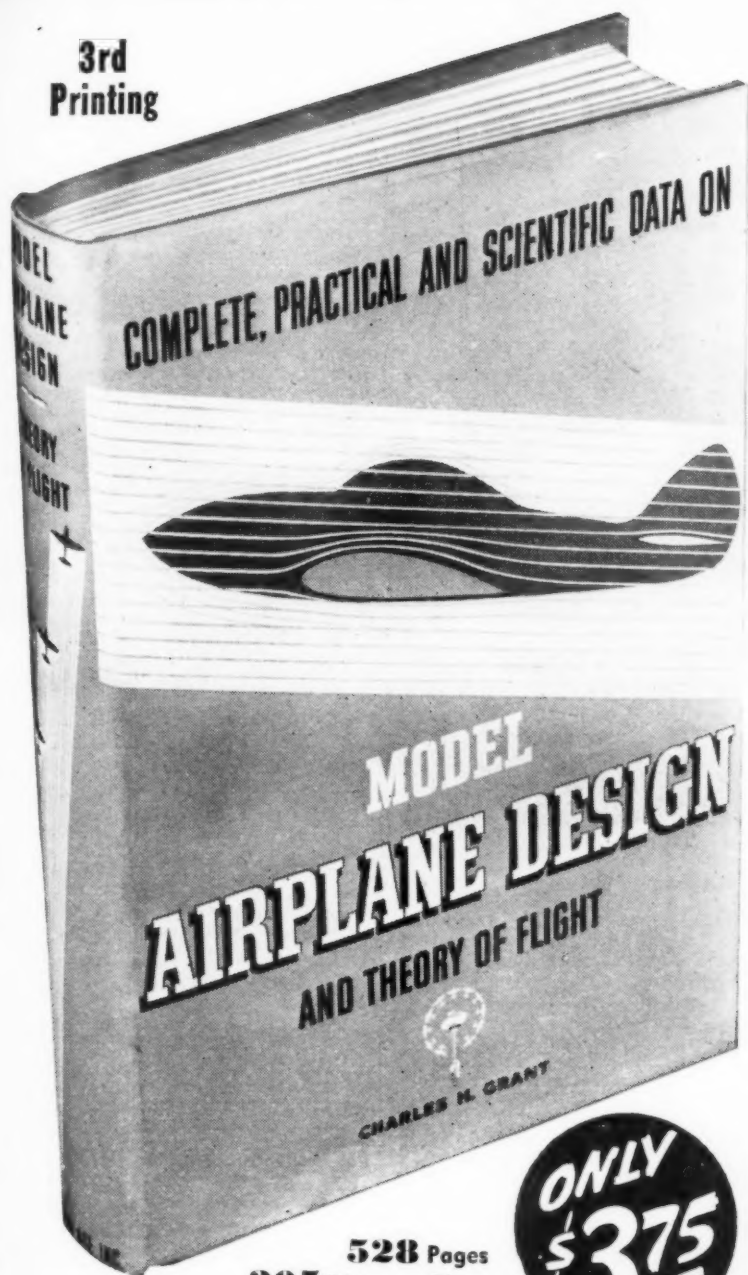
New York

The Air Scouts of Wappingers Falls, New York, will hold the Hudson Valley Spring Gas Meet on Sunday, May 7th, at Coles Airport, Wappingers Falls. All gas classes (A, B and C) will compete in separate groups and a large list of valuable prizes has been assembled for the occasion. The Air Scouts, who are affiliated with Troop 27 of the Boy Scouts of Wappingers Falls, are sponsored by the Lions Club of that village. For information regarding location of the airport and entry fees, write Carroll Moon, Contest Director, Chelsea, New York.

The Richmond Model Flying Club wishes to announce a series of six contests they are planning to hold through the coming season. The contests will be sanctioned by the A.M.A. and one will be held every six weeks. The dates are as follows: March 26, May 7, June 18, July 30, September 10 and October 22. Gas, rubber and towline glider contests will be held and there will be plenty of prizes in the form of trophies, medals and merchandise. The contests will take place at Hicksville, Long Island, and will be open to all modelers everywhere. Write to William Peters, 26 Bond Street, Port Richmond, Staten Island, New York, for details.

The Williamsburg Model Craftsmen is the oldest model club in Brooklyn, New York, and the annual election and awards night was recently held. Joe Hoffman (Turn to page 60)

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Model Airplane News - May, 1944

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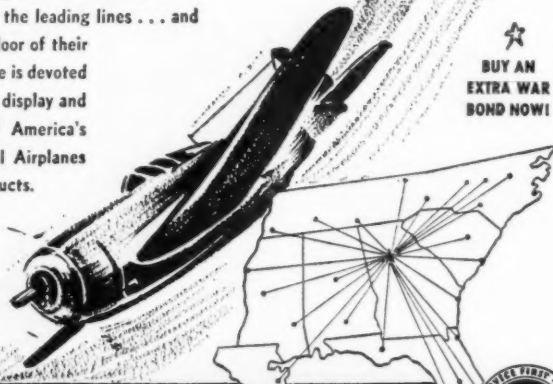
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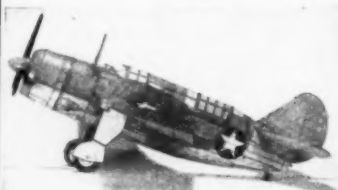
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was unanimously elected president, Jack Newman, secretary, Lenny Silverstein, corresponding secretary and Danny de Louise, treasurer. The awards were handed out for the yearly contest system as follows:

Class A—1st Place—Joe Hoffman
2nd Place—Sid November
Mario Stanideo

Class B—1st Place—Jerry Keller
2nd Place—Lenny Silverstein

Class C—1st Place—Sid November
2nd Place—Stanley Terry

All first place winners received silver medals. All second place winners re-

ceived bronze medals. The coveted trophy for high points was won by Sid November. Although the war has decimated their ranks, the Williamsburg Model Craftsmen have "kept 'em flying." They have opened their membership rolls to any modelers within New York City and anyone interested is invited to contact Jack Newman, 2 Willett Street, New York City.

California

The Gas Model Airplane Association of Southern California has fired the opening guns in the battle for the first Nationals following the war. Ray Acord, president of the group, says: "Inasmuch as our club is located right in the heart of the aircraft industry and it is comparatively easy for us to raise cash for trophies and awards, we have decided to start a movement to hold the Nationals on the West Coast, or to have an elimination contest for the western states. Our belief is that after the war there will be no housing problem, there will be beautiful sites for both indoor and outdoor flying and we will be able to make such a contest attractive by offering large cash awards to the winners—not fifty or a hundred dollars—but real cash prizes. (Something of the nature of these prizes may be gathered by the photographs of some recent winners and their trophies shown at the bottom of this page.) Here are the results of the recent contest:

Class A—1. Ray Acord, Modelcraft Trophy, \$50.00 bond

2. Milton Ronney, Reg Denny Trophy, \$25.00 bond

3. Bill Butler, E. E. McDonald Trophy, \$25.00 bond

Class B—1. Harold Viault, Ohlsson & Rice Trophy, \$50.00 bond.

2. Allen Trainor, Comet Trophy, \$25.00 bond.

3. Richard Reese, Pico Model Shop Trophy, \$25.00 bond.

Class C—1. Bill Crany, Morgan Model Supply Trophy, \$50.00 bond.

2. Bob Gunzel, Austin-Craft Trophy, \$25.00 bond.

3. Frank Cummings, Freelance Hobby Trophy, \$25.00 bond.

The bonds were awarded by Consolidated, Douglas, Lockheed, Hughes and Aircraft Accessories companies.

A new club, known as the East Bay U-Control Flyers, has been organized by Robert H. Churchill, 3803 Midvale Ave.,



Some idea of the trophies being handed out to modelers in Southern California. Whew!

Oakland, Calif. The club has been awarded a permit by the Oakland Board of Park Directors which orders that "restricted areas be set up in Leona and San Antonio parks in East Oakland on Sundays and holidays for the exclusive use of groups flying gas and rubber driven models and gliders. Participation will be limited to members of organized groups and each group will be required to police the flying for the protection of spectators." The flying fields will consist of circles 150 feet in diameter and each field will be graded and improved to make it suitable for the purpose.

The East Bay Aeroneers of Oakland, California, recently held elections and the following officers were installed for 1944: President Charles Hubbard, Vice-President Jack Dyer, Secy.-Treasurer Gordon Blue and Sgt. Arms Russ Watkins. June Dyer holds forth as Publicity Manager and she has been doing a swell job. Results of their latest contest is as follows:

Class A 1st.	Gayford Fleharty	6:11
2nd.	Gordon Blue	5:02
3rd.	Bud Romak	4:50
Class B 1st.	Don Foote	5:15
2nd.	Charles Hubbard	3:29
3rd.	Freeman	2:20
Class C 1st.	Rod Beedle	11:21
2nd.	Russ Watkins	9:32
3rd.	Bud Cope	8:43

(All times are in minutes and seconds.) A five minute limit was observed and the r.o.g. rule was used. The day was cold and calm with few thermals. It began raining before the contest closed but the boys stayed out to complete their flights.

VICTORY

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Grumman 'Avenger'.....20 1/2"
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Thunderbolt.....16"
'Mustang'.....17"
Grumman 'Wildcat'.....16"
Focke-Wulf.....18"
Messerschmitt '109'.....16"
'Spitfire'.....18"
Curtiss 'P-40'.....16 1/4"
'Airacobra P-39'.....17"

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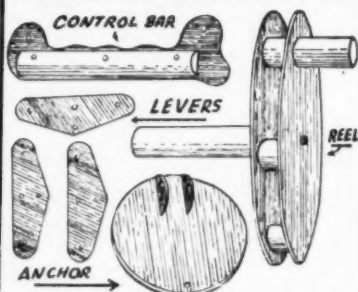
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mand at Wright Field, Ohio are engaged
in an accelerating program of testing and
developing these new ideas and designs
in a never ending struggle to keep the
AAF in a position of leadership among
the world air powers technically and
operationally."

Discussing the many new develop-
ments in progress at Wright Field, Gen.
Branshaw explained by way of illustra-
tion:

"Highly accurate bombsights and jet
propulsion planes, marvelous as they
have turned out to be, will soon give way
to even greater marvels."

The AAF Materiel Command is respon-
sible for engineering, development, pro-
curement, production and inspection of
all Air Force equipment. The billions of
dollars appropriated by congress for the
Air Forces flow in large part through the
Materiel Command to contractors and
subcontractors all over the nation.

Pointing to the development of the
B-25 cannon-carrying planes, whose 75
mm guns caused consternation in Japa-
nese ranks only a short time ago, Gen.
Branshaw gave unstinting praise to Brig.
Gen. Franklin O. Carroll, engineering
genius of the command; Brig. Gen. A. E.
Jones, then chief of the Procurement Di-
vision; Brig. Gen. Orval R. Cook, Chief
of the Production Division; Col. Franklin C.
Wolfe, Armament Laboratory; and many
others of his staff for the planes and
weapons that have made the United
States Army Air Forces the most power-
ful of all time.

Long before the war began, Gen. Bran-
shaw revealed, experts of the Materiel
Command were working quietly, though
often hampered by lack of funds, to con-
ceive new ideas, to test, redesign, dis-
card and revive hundreds of projects in
an effort to insure the United States
against general aircraft superiority by
any other nation.

Almost unknown is the fact that the
epic change of the airplane from a bi-
plane hung together with struts and
wires—the flying machine of World War I
—to an internally braced monoplane of
extreme symmetry and power, was
brought about by engineers of the Mate-
riel Command. So was the change from
wood and fabric to all-metal construction.
Manufacturers' engineers also contrib-
uted to these Army Air Forces develop-
ments.

The Materiel Command, with the aid of
the American rubber industry, developed
a self-sealing tank so successful that the
Germans have literally copied it, aban-
doning their own designs.

The first high-powered, air-cooled en-
gines caused considerable trouble to air-
plane manufacturers until Materiel Com-
mand engineers found a way to keep
valves from burning out at extreme tem-
peratures. Liquid-cooled engines also
have been vastly improved, enabling en-
gine power to be stepped up from the
400 HP of the 1918 Liberty to more than
2,500 HP now.

For many years Materiel Command
engineers struggled with the develop-
ment of a satisfactory turbo-supercharger,
even after industry had dropped the idea
as presenting insurmountable difficulties.
Then, persisting, and with the collabora-
tion of General Electric, they succeeded
in producing a supercharger which now
takes Allied planes to heights undreamed
of 10 years ago.

Never satisfied, engineers of the Com-

mand have striven constantly to develop new planes, new ideas, new equipment. Among the many accomplishments of which they have been silently proud are the parachute generally accepted by all nations; first radio beacon; retractable landing gear; first night flying equipment; an automatic pilot which takes over on bombing runs to insure an unwavering approach to the target; high altitude equipment; and a bombsight so accurate American bombardiers have long boasted it enabled them to hit a pickle barrel from 30,000 feet.

Ideas flow into the Materiel Command laboratories at Wright Field from all over the nation. Boeing engineers design a new super-bomber, Materiel Command experts immediately begin tests, working on changes, revising plans to meet current or future war trends and needs. Northrop, Douglas, Lockheed, North American and others produce new fighter planes, and again Materiel Command experts go to work, revamping a wing-tip here, a tail surface or gun mount there.

Or the process may be reversed, and a design will be transmitted to a manufacturer with instructions to build a new plane—such as the jet propulsion ship constructed by Bell. Aero-Medical experts test electrically heated clothing, gloves and helmets for use in high altitude temperatures as low as 70 below zero. A request is made to a manufacturer and the equipment is made. Then, after exhaustive tests, if the new plane or equipment is accepted and production is decided upon, from Materiel Command headquarters flows a stream of orders to prime contractors and through them to the thousands of subcontractors who will make the many parts needed.

If a new plane comes off the assembly line, Materiel Command engineers are not satisfied just because it is ready for combat. Back from the war theaters come reports of performance, demands for more guns, more maneuverability, or a hundred and one other recommended changes, and the engineers swing into action again.

But even then the Materiel Command will not be satisfied. With the future of aviation in mind, and carrying on the work begun by the Wright Brothers, its engineers will continue their efforts to produce better planes and better equipment to insure America's mastery of the air.

VICTORY

MODELERS

We are anxious to publish news of your experiments. Send photographs and data to "Air Ways."—Editor

PHOTO CREDITS

Page	Source
6	Army Air Forces
7	Acme
9	North American Aviation
20-21	Top, North American Aviation Left, Monkmeyer Right, Acme
25	North American Aviation
30	Air Age Technical Library
61	AAF Materiel Command

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18" Speedomatic Kits—25c ea.
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Mustang Thunderbolt

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Master Models—50c each

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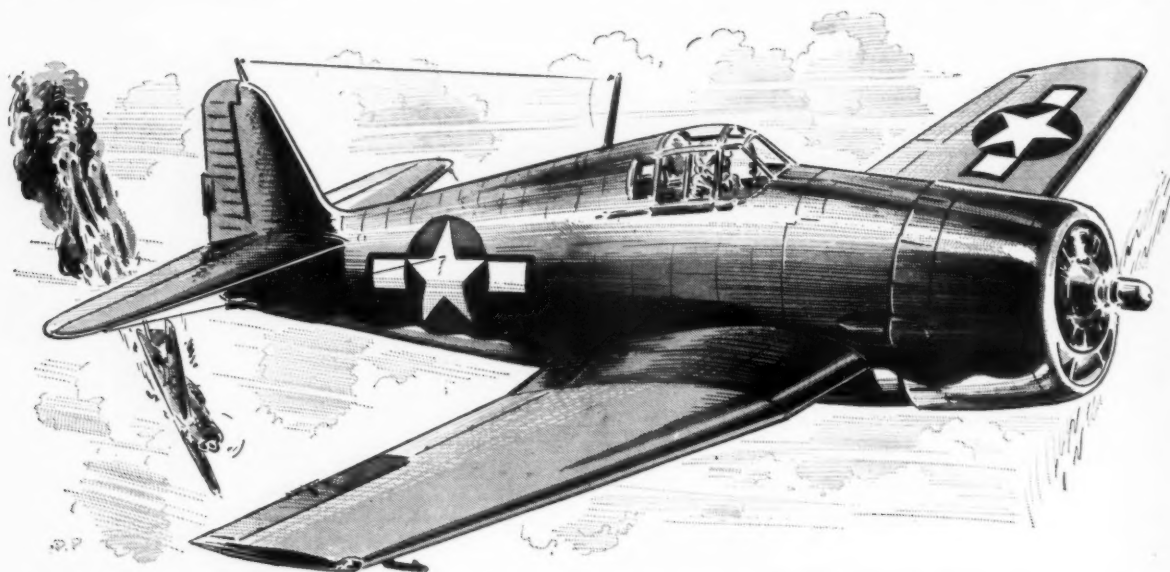
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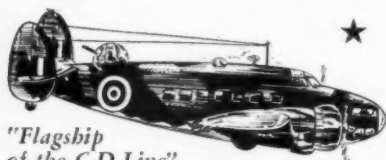
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Build this "spittin' image" of the Navy's latest standard carrier-based plane. With its heavy armor, lightning maneuverability and terrific climbing speed, the "Hellcat" is considered the world's most powerful carrier-based plane. In reality "the pilot's dream," for it was actually designed to the features they

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Build this big 49 1/2" authentic model of the bomber that the British fondly call "Old Bomerang" (for she invariably manages to come back). The "Hudson" has been used extensively by the British over Europe and Africa, and by the United Nations over the Pacific. Has bombed, done reconnaissance work, and fought. C-D MASTER Flying Model Kit SF-95..... **\$7.50**



Bell P-39 "AIRACOBRA"

A swell model of the hard-hitting fighter that the Japs say "is hell on landing boats." The Airacobra "cannon-plate" strikes quick and deadly, and has taken a big toll of enemy tanks, replacements, submarines and big planes. Model span 25 1/2". C-D MASTER Flying Model Kit SF-76..... **\$3.00**

BEGINNERS!

If you've never built any models before, start with the simple C-D gliders, or the C-D Industrial Training Models. The Cleveland SF Models are only for the more experienced. C-D Models are built up from strip stock and printed out curved parts, covered with tissue, and doped with authentic camouflage colors. They are minutely detailed, and authentically designed, capable of beautiful flights with rubber power (when rubber is available).



CURTISS P-40

A favorite among modelbuilders is this 28 1/2" miniature twin of the famous "sleeper of the skies". The Curtiss P-40 has fought on every front, and been used as a fighter, fighter-bomber, killer, and for ground cooperation. C-D MASTER Flying Model Kit SF-77..... **\$3.00**

ALWAYS REMEMBER

C-D's are the "Aristocrats" of model airplane construction Kits—tops in authentically-engineered, super detailed designs, and all capable of realistic flights.



Republic P-47 "THUNDERBOLT"

A strikingly realistic model of the "diving battleship", the name most nearly descriptive of the great destructive power of the "Thunderbolt". With a 40,000 ft. ceiling, and 400 m.p.h., plus the "Thunderbolt" is doing a marvelous job for the Allied bombing missions over Nazi-occupied territory. Model span 30 1/4". C-D MASTER Flying Model Kit SF-81..... **\$4.00**



De Havilland "MOSQUITO"

World's Fastest Operational Bomber

Build this sleek, authentic 40 1/2" miniature of the plane that is considered one of England's outstanding aeronautical achievements in the war. The "Mosquito" has proved itself a first class pest to the Nazis, for it is classed as a fighter-bomber-intruder, and can sting and then invariably outrun its pursuers. C-D MASTER Flying Model Kit SF-145..... **\$4.50**

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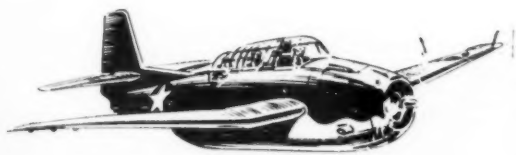
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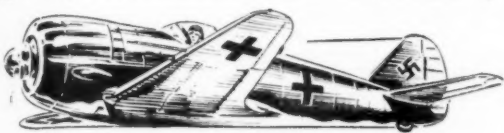
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Grumman "AVENGER"

A startlingly realistic big 30 1/2" model of "the plane that saved Midway." In its bold raids on Jap task forces, the carrier-based torpedo bomber "Avenger" has accounted for innumerable ships sunk. First ones were mistaken by the Japs for "Wildcats"—with disastrous results to the Japs. C-D MASTER Flying Model Kit SF-93 **\$400**



FOCKE-WULF

Germany's Challenge to Allied Air Superiority

A recently introduced C-D Model in big demand because it's a true miniature of the plane that is offering chief fighter opposition to the Allied bombing missions over Germany. The Focke-Wulf 109 is powerful, in the 300 m.p.h. class, and packs a real wallop in its heavy machine guns and cannon. Latest type is equipped with rocket guns. Model span 27 1/2". C-D MASTER Flying Model Kit SF-92 **\$300**

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These 3-foot models are authentic and extremely realistic for the standard size to which they are designed. Developed primarily for School Training Programs, their popularity was instantaneous—and their low price enables building the entire set at very little expense.



T91-"Mustang"



T77-"Warhawk"



T78-Hurricane



T76-Airacobra



T74-Messerschmitt ME-109

Each Kit Only

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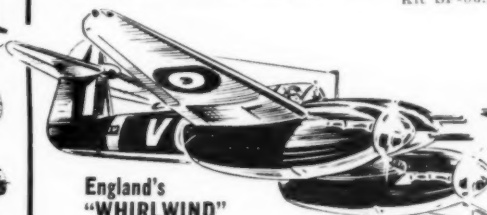
North American "MUSTANG" (P-51)

Modelbuilders rave over this 27 3/16" miniature of the tough, vicious "Flying Bronco" that has become known as one of the war's most versatile planes. The "Mustang" is a deadly fighter high "upstairs," and equally destructive on ground hugging missions. Pilots like its ease of control at top speeds. C-D MASTER Flying Model Kit SF-91 **\$300**



Lockheed P-38 "LIGHTNING"

An instant "best seller" in models because it authentically duplicates one of the war's most extraordinary planes. The "Lightning" can climb so fast as to make the speedy Zero seem almost standing still. It's so fast that pilots have to drop the flaps to keep in a dust! High ceiling—terrific diving power. Model span 38 1/2". C-D MASTER Flying Model Kit SF-85 **\$400**



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Japanese "ZERO" Fighter

Cleveland's authentic model version of the speedy, tricky, fast climbing Mitsubishi "00". Even when piloted by the cream of the Jap Air Force, "Zeros" were constantly "exploded" right out of the sky by Allied fighters due to lack of armor and vulnerable fuel tanks. Model span 29 1/2". C-D MASTER Flying Model Kit SF-86 **\$300**



Vought-Sikorsky "CORSAIR"

Build this miniature "Twin" of the fighter the Marines call the "best d--- fighter in the world." The "Corsair" is considered the world's fastest and deadliest shipboard fighter with a speed greatly in excess of 400 m.p.h. and 6-8 guns. Exceptionally maneuverable. Model span 30 3/16". C-D MASTER Flying Model Kit SF-79 **\$350**

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Continuing he says:

... I have flown almost every type airplane there is. I started building models when I was 12 years old and I was a member of the National Adv. Model Engineers for a long time. There is no question in my mind that your very detailed models were the most outstanding step in the start of my aeronautical career.

"Even at the present time I am working on some Cleveland Models because I am in the hospital. I broke my back 6 1/2 months ago while running some dive tests on a P-47 which caught on fire in the tail section while diving. I bailed out at 32,000 ft. and at 500 m.p.h. When my chute opened, I broke my back. I received the D.F.C. for the 25 successful dives which I made before I bailed out.

"I have made a model of the P-47 and I chose a Cleveland Model because it is the most lifelike. The P-38 is my favorite airplane. I also made a Cleveland Model P-38, while I have been in the hospital. I have made P-6E, P-6 Polish Fighter, Jenny, DH4, Howard Racer, Gee-Bee, Laird 400, etc.

"I think your models are very good for recognition because they are all the same scale which gives you a comparative idea of the airplane, also the detail is excellent."

A Cleveland Model Booster

Maj. P.J.R., AAF

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